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Present Position of Lead Smelting in Germany.

BY F. T. HAVARD.*

The débacle in the lead-smelting industry of Germany has been long expected. That it is not already history is due to these principal causes:

(1) The steady rise in the price of metals. Thus stocks have appreciated, custom smelteries have worked in a rising market, and mining and smelting companies like Mechernich, whose properties are almost worked out, have been reluctant to shut down while their metals fetched prices which permitted them to raise low-grade ore.

(2) The reduction in the costs of working due to the introduction and successful application of the Huntington-Heberlein process. Many older companies took the opportunity while installing this process to remodel or improve their plants, and in all cases the introduction was followed by a reduction of costs, particularly in the roasting and smelting departments.

(3) The extraordinary advance in the price of antimony has caused a rise in the price of hard lead, while payment for antimony in ores has remained normal. The consequent profit made on hard lead has helped all works, particularly, however, those smaller works which make more or less a specialty of the manufacture of alloys.

It cannot, however, be more than a short time before the majority of the smelteries will be obliged to shut down, unless some radical change takes place in the handling of the ore market. Most of the works live on foreign ore, a great part of which is in the form of concentrates from Broken Hill, N. S. W. This foreign ore, amounting annually to about 100,000 tons of lead concentrates and 20,000 tons of mixed silver-lead and dry silver ores, is imported through two or three strongly financed houses, of which the Metallgesellschaft of Frankfurt am Main and Beer, Sondheimer & Co., of the same city, a more recent but extremely versatile and active firm, are the most powerful.

The Metallgesellschaft satisfies the requirements of its own works first, provides ore for the smeltery at Braubach and then for those works which have installed the Huntington-Heberlein process, the patent rights of which belong to this company. Beer, Sondheimer & Co. sell to all smelters, but are especially interested in the zinc and lead works at Overpelt, Belgium.

The returning charges allowed by these firm on ores sold to the independent smelteries are extremely low, amounting in the case of lead concentrates to 38 to 40 shillings c.i.f. Antwerp or Hamburg (equivalent to $7 or $8 f.o.b. works), with full pay for all lead, gold and silver. Should copper be present, full payment of all metal found by electrolytic assay is demanded and the returning charge is raised by only a few shillings. For dry silver and gold ores the competition is almost equally keen, and the margin for profit on these is only a little more than on the concentrates.

It is possible that this deplorable position of the smelters is not as much the result of past competition among the private works as of the suicidal tactics adopted by the directors of some of the royal smelteries, of buying lead concentrates at any price in order to keep their bins full. All efforts to form a union of smelteries to combat the demands of the dealers have been frustrated by the action of the fiscal works. Appended is a list of smelteries with their silver and lead output for the last three years. At the present time Freiberg and Mechernich are actually considering the closing down of their smelteries. The works at Call and those at Stolberg (both Rhein-Nassau and Stolberg) are making a plucky fight, and by careful management and nearly complete condensation of metal fume they probably show a profit on the year's run. Call is, it is true, further assisted by its stock of slags and tailings from ancient Roman workings on which it draws industriously. Ems uses its own ore and will live as long as its mines are worked. Braubach is a well managed plant of fair equipment, with strong financial backing, and will probably work prosperously under the patronage of the Metallgesellschaft when its less fortunate rivals are idle.

Of the Silesian plants, the Friedrichshütte, at Tarnowitz, a royal Prussian plant, smelts about 70,000 tons of ore per annum from its own mines. Almost the whole plant has been in late years rebuilt, a costly and complete flue-dust condensation system having been constructed, and much time and money devoted to perfecting the hygienic and sanitary conditions and minimizing lead poisoning. Briefly, the condensation of fume is effected by driving and sucking the hot furnace gases through a system of water-sprayed towers, spraying the fume before and after its passage through the various blowers, and settling and collecting the dust in spitzkasten. The wash water is neutralized by pumping it through towers into which lime water is injected. Thus almost all the sulphur that comes into the works finds its way to the dump in the form of sulphite and sulphate of lime, at a cost, however, which must seriously affect the rentability of the process. The neutralization of the acid water, which formerly ran off to the nearest stream, was insisted upon by the local forest authorities. The lead smeltery attached to the zinc works of Giesche's Erben, viz., the Walter Croneckhütte, at Rodzin, smelts both ores from its own mines and custom ores, and competes actively in the litharge and massicot markets.

Of the Upper Harz works, Clausthal smelts about 14,000 tons of local ores. The resulting bullion is refined and desilverized at Lautenthal. Altenau treats principally lead-copper matte from the Harz and the Rhenish smelteries, performing for these works much the same functions which the Philadelphia plant at Pueblo exercises for the American Smelting and Refining Company. Altenau makes its copper regulus of 90 per cent. copper content in the old-fashioned *brillenöfen* and separates the precious metals from the copper in an electrolytic parting plant. The Silberhütte of the Anhalt Lead and Silver Works belies its name more or less by working as a chemical factory. The copper works of Oker and Mansfeld make some lead, the former about 5000 tons; the latter about 500 tons per annum. The Rammelsberg ores are treated at Oker, which also works up copper-lead mattes by the same process as that used in the Philadelphia plant, namely the Swansea process. Freiberg makes only 5000 tons of lead per annum in both its smelteries (Halsbrücke and Muldenhütten) but ranks third in silver production.

*Silberhütte, Anhalt, Germany.

LEAD AND LITHARGE PRODUCTION OF GERMANY.
(In metric tons).

A. Smelteries of Rhineland-Westphalia.	1905.		1904.		1903.	
	Lead.	Litharge.	Lead.	Litharge.	Lead.	Litharge.
Stolberger Gesellschaft	16,517	101	16,570	100	16,490	109
Rheinisch-Nassauische Gesellschaft	11,650	....	12,101	....	11,908	....
Mechernicher Bergwerksverein	11,250	....	10,459	....	14,654	....
A. Poensgen & Söhne, Hütte zu Call	12,235	....	10,372	....	9,851	....
Gesellschaft des Emser Blei- und Silberwerks	4,258	....	3,787	....	4,259	....
Blei- und Silberhütte Braubach	20,894	....	20,290	....	20,147	....
Total	76,804	101	73,579	100	76,909	109
B. Smelteries in the rest of Germany.						
Victoriahütte bei Niederfischbach	.....	....	.....	....	.....	....
Rothenbacher Hütte im Siegerland	24	288	24	262	17	265
Walther-Croneckhütte bei Rodzin (Giesche's Erben)	8,945	1,238	8,367	1,134	6,719	1,092
Königl. Hüttenamt Friedrichshütte bei Tarnowitz	41,610	649	31,017	1,025	35,005	1,244
Oberbergamt Clausthal, Oberharz	8,767	....	10,392	....	10,292	....
" " Unterharz	5,142	....	5,071	....	4,977	....
Königl. Oberhüttenamt Freiberg	5,146	99	5,452	138	7,364	228
Anhaltische Blei- und Silberwerke (Anhalt)	1,970	1,212	1,661	1,473	2,417	1,416
Norddeutsche Affinerie zu Hamburg	9	302	8	202	.....	74
Mansfelder Gewerkschaft (Silberhaltiges Blei)	268	....	340	....	291	....
Total	71,881	3,788	62,332	4,234	67,082	4,319
Total of A and B	148,685	3,889	135,911	4,334	143,991	44,428

SILVER PRODUCTION OF GERMANY.

	1905. kg.	1904. kg.	1903. kg.	1902. kg.	1901. kg.
Stolberger Gesellschaft	42,593	40,068	31,936	46,312	32,225
Rheinisch-Nassauische Gesellschaft	15,557	15,491	14,325	14,825	14,314
Mechernicher Bergwerksverein	5,498	3,239	6,978	15,034	18,214
A. Poensgen & Söhne, Bleihütte zu Cal	13,742	16,630	19,285	9,956	8,364
Rothenbacher Metallhütte im Siegerland	590	626	465	504	673
Victoriahütte bei Niederfischbach	.....	.....	.....	463	1,323
Gesellsch. des Emser Blei- u. Silberwerks	4,540	2,622	2,324	4,739	6,236
Blei- und Silberhütte Braubach	34,620	28,400	28,155	29,536	23,591
Walther-Croneckhütte bei Rodzin (Giesche's Erben)	1,205	1,545	916	1,228	1,131
Königl. Hüttenamt Friedrichshütte bei Tarnowitz	11,270	12,563	9,909	8,981	7,162
Mansfelder Gewerkschaft	101,290	100,233	97,358	98,446	99,132
Oberbergamt Clausthal, Oberharz	28,468	36,854	37,431	37,224	27,474
" " Unterharz	10,275	10,425	11,628	11,522	11,289
Königl. Oberhüttenamt Freiberg	70,372	74,414	73,656	91,713	76,473
Anhaltische Blei- u. Silberwerke (Anhalt)	7,497	4,639	4,600	7,484	7,582
Norddeutsche Affinerie zu Hamburg	92,274	84,686	74,613	69,202	80,610
	439,791	432,135	413,579	447,119	415,793

Freiberg, Braubach, and Anhalt use the Pilz furnace; Tarnowitz, Walter Croneckhütte and Clausthal the round furnace with side-feed and stack; the Rhenish works the oblong furnace, known as the "Raschette-Ofen," with tuyeres (generally 12) at the back, long side only, and with water-jackets on the two short sides.

Another essential difference between American and German practice is to be found in the fact that the Germans generally run a charge richer in lead than the Americans, who treat more dry ores and regard lead concentrates almost in the light of a collector for the precious metals.

One American blast furnace has been blown in at the progressive zinc and lead works at Overpelt, but I believe none has been introduced into Germany. Braubach is said to be quite satisfied with the behavior of its Pilz furnaces and probably as long as it works with a charge containing over 30 per cent. lead will not introduce the American type of furnace, and consequently not learn the advantages which it offers in the treatment of most kinds of charge, but especially where a big tonnage of ore, with a comparatively small resulting lead fall, is to be treated.

Every German works possesses a refinery and markets its own lead. Some works part their doré bullion; others sell it, as such, to the Scheideanstalt of Frankfurt am Main, which charges at the rate of 90 pfennigs per kilogram of bullion for parting. The process more generally used is the electrolytic; viz., the Moebius or a similar process. Freiberg has recently abandoned parting with sulphuric acid in favor of the electrolytic process.

Freiberg still uses the Pattinson process in addition to the Parkes, with the object of concentrating the bismuth content of the work-lead in the richer silver-lead alloy, which is treated directly in a German cupeling hearth, where litharge, bismuth-litharge, and silver result in the order named. The silver-lead alloy from the Pattinson process is treated in the Parkes pots. The zinc is distilled from the rich scum either in direct- or gas-fired Stolberg retorts, or in graphite crucibles.

Although most of the German smelteries have increased rather than diminished their tonnage in late years, yet the margin of profit per ton is so much less today on account of the reduction in smelting charges that many would have been obliged to shut down if they had not succeeded in reducing materially their smelting costs, and in working with but small metal loss. In this latter particular they can probably show better figures than American works because the lead percentage in the charge is greater, the furnaces are under less pressure and temperature, and the flue and chamber system is either very complete or is aided by methods of deposition and collection such as that of Tarnowitz. The slags dumped are certainly not so clean as the American slags, but on the other hand less is made in proportion to the amount of lead put through the furnace.

Working costs vary in the several works, as those who compare the equipments of Freiberg and Braubach will readily understand; in the more modern class of smelteries, however, costs are not very different from those of American works, viz., 9 to 15 marks against $2.25 to $3.25 for smelting, while in refining the laurel is probably with the Americans. Labor in Germany is cheaper (3 marks per shift against $2.25 to $2.50) but it is much less efficient. The American works have a better and cheaper system of sampling, more skill in handling large quantities of ore, matte, slag and other materials; they excel in equipment, mechanical and labor-saving, such as feed-cars, settlers, sampling and crushing mills, conveying and elevating apparatus and smelter bins, in organization, and in the intelligence and endurance of foremen and furnace men.

It is true that the problems facing the metallurgists in America and their brethren in Germany are of a different character. The business of the German is treating small quantities with minimum loss; that of the American is handling large quantities of ore, smelting it rapidly, and getting the finished products away from his plant quickly, avoiding any drag on his routine work that might be caused by the working up of by-products into any form other than that of metallic lead and silver, hard lead, or high-grade matte. The German pays more attention to the treatment of his by-products, which he prepares cheaply for a ready and profitable market. In the handling and separation of slag and matte the Germans have much to learn from the American system of deep settlers with slag overflow and matte tap, and the accompanying excellent dumping-bowl of slag cars. It is still not unusual to see the yard of a fair-sized German smeltry filled with slag cones from the heads of which workmen laboriously knock off the matte which had run from the furnace with the slag directly into the hand-moved slag pot standing under the slag spout. Nor do the majority of German metallurgists concentrate their lead-copper matte as quickly and cheaply as their American brethren; probably because they roast the low-grade stuff insufficiently in heaps or kilns, and run the furnace charge with so much surplus iron that a considerable concentration in one operation is scarcely possible.

In conclusion, though the technology of lead smelting is more advanced today in America, we must not, however, forget that these small German works have played a rôle in the history of lead smelting and refining quite out of proportion to their tonnage and output, wherefore in their present struggle against the forces opposed them we will wish them *"guten Mut"* and a hearty *"Glueck auf."* *Bene non vale dicemus.*

Goldfield, Nevada.

BY CLAUDE T. RICE.

Goldfield has a population of between 7000 and 8000 people, while probably 700 live at Columbia, about a mile from Goldfield, and at Diamondfield about four miles to the northwest there are about 300 people. The life at Goldfield is in the main quite similar to the life at Tonopah. At night the saloons are packed with the miners and others, and every saloon has its roulette wheel, faro game, and generally crap and draw poker. But on the other hand many of the men in Goldfield have their families with them and the place is beginning to assume a good settled look. There are two hospitals and many doctors. Also there are many assayers and surveyors located at Goldfield. The camp has already produced between six and seven million dollars.

MAIN STREET, GOLDFIELD, NEV.

The first mineral at Goldfield was discovered, in the fall of 1902, by Harry Stimler and Will Marsh on the Sandstorm claim, and a rush was started from Tonopah when, in May, 1903, the news of the discovery reached Tonopah after they, together with some of their friends, had completed the location of several claims. However, most of those who then went there soon left to try their luck elsewhere. Soon afterward the Combination mine was discovered.

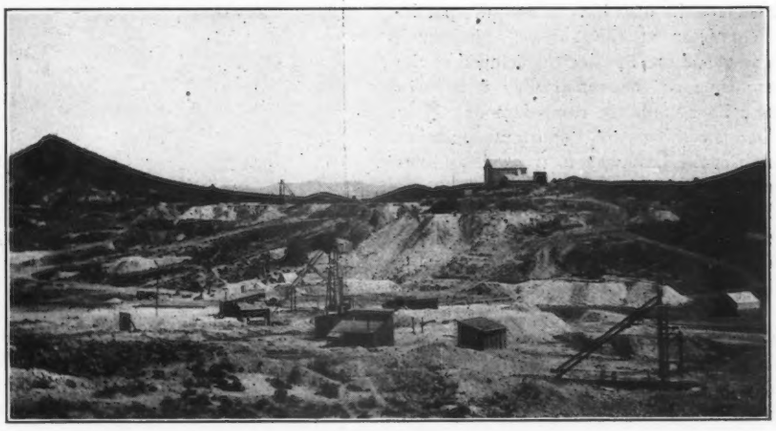
In the middle of the summer there was another rush to Goldfield, induced by the richness of the Combination and the Jumbo mines, discovered by C. D. Taylor, in both which mines $150 ore had been found. The second rush was also rather abortive, but the excitement continued to increase until finally by the first of January, 1904, the rush was on for good and the excitement has continued, although now the stampeder has left for Bullfrog, Manhattan, Fairview and the newer camps.

OPEN CUT COMBINATION VEIN, GOLDFIELD, NEV.

Goldfield owes its development to leasers. Practically every mine in the camp, except the Combination, was developed by leasers. The upper parts of these veins have produced uncommonly rich ore and lots of money has been made from them, although of course there have been many unsuccessful leases. Many a leaser has missed the ore by too little panning and assaying of the rock which he has been working. In fact, it is necessary to pan or assay practically every foot of ground in these mines.

The leases are generally taken at 25 per cent. royalty, the royalty being computed after treatment and transportation charges have been deducted, but some are let at as low as 20 per cent. royalty. The leases are made on blocks of ground so many feet wide and so many feet long. No law of the apex enters into these propositions; the leaser mines all the ore in the claim within his vertical lines. The leaser first uses a windlass, then a whip or whim, but in few instances has the ore been whipped out. These whims are sometimes of the geared type put on the market by certain manufacturers, while in other cases some local blacksmith constructs a home-made one. The whim is used generally until the ore is reached. A tripod head gear about 12 ft. high is used with the whim. But after ore is found,

FLORENCE LEASES IN FOREGROUND. COMBINATION MINE AND MILL IN DISTANCE.

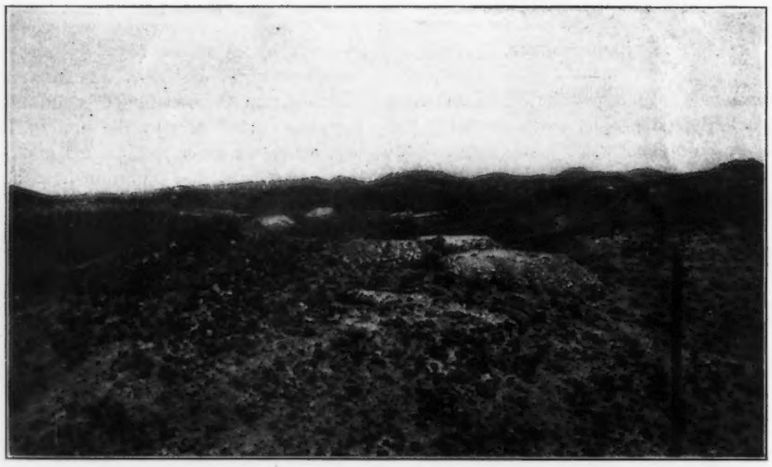


JUMBO IN DISTANCE. FLORENCE LEASES IN FOREGROUND. GOLDFIELD, NEV.

and sometimes before, a gasolene hoist is installed with a small head-frame. Buckets with crossheads are used in all these leasing operations. The Fairbanks-Morse gasolene hoist is the one generally used and it has given very good satisfaction, but some other gasolene hoists are employed in the camp.

The leaser then begins to block out his ground by drifts and cross-cuts, the idea being to open many working faces so as to break as much ore as can be hoisted. Three shifts are run and every one is on the jump. All ore hoisted by the leaser and on the surface at the expiration of the lease belongs to the lessee. In this way practically all the mines in the camp were developed.

Small shafts, 7x5 ft. in the clear and sometimes only 7x4 ft. are used. The shafts are timbered with 5x6-in. timbers and 2-in. plank lagging is used. The ground is fairly soft and so the cost of development is small. After mining by the company begins, electric hoists are generally installed. At the Combination,



PROSPECT BETWEEN SANDSTORM AND GREAT BEND.

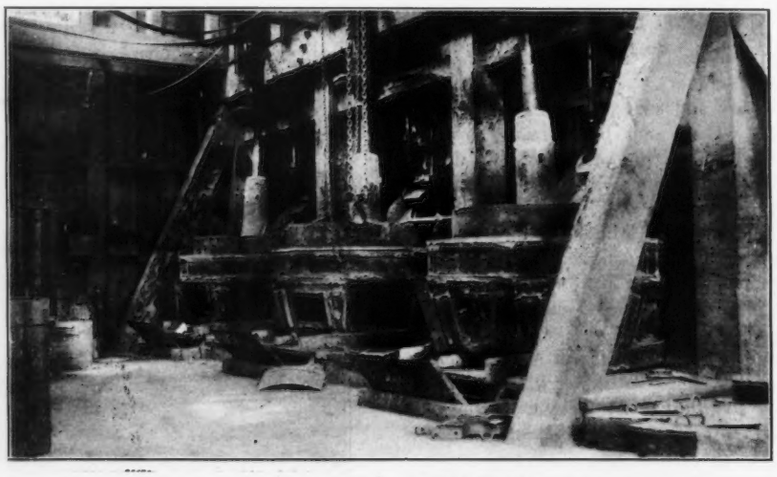
KINKEAD MILL. BOOTH AND LAGUNA MINES IN COLUMBIA MOUNTAIN.

cages and cars are used, and they will soon be installed at other mines. Single jacking has been the practice heretofore, but recently several air compressors and drills have been contracted for and will soon be in use. All the mines are shallow as yet, being generally not more than 300 ft. deep. The ores have been quite patchy in character at the surface, but much lower-grade ore has been developed at the same time as the remarkably rich ores which have made the camp famous. Now it is becoming an important question which is the best way to treat these low-grade ores.

The geology has been well outlined in the recent paper by J. B. Hastings. The orebodies are gold-bearing veins in silicified country rock. The whole region is composed of Tertiary volcanics of the same age as the Tonopah rocks. The ore is all oxidized down to a certain depth when the sulphide ores come in, and also water, the whole region having plenty of water underlying it, in this respect differing greatly from Tonopah. Pyrite, quite fine grained, is the main ore carrier in the camp, although some copper occurs in these sulphides. The country rock is soft and this is going to cause more or less trouble in mining the orebodies. Nothing can be told of the value of the ore in Goldfield by its appearance; consequently constant panning in the oxidized ore and check assays have to be made, while in the sulphide ore, assays alone indicate the value[1]. Very little post-mineral faulting has occurred in the Goldfield orebodies so far as they are developed.

The paying orebodies occur in a sort of horseshoe zone. The present southern and eastern extension of this mineral zone occurs in Gold Bar ground, where some $250 ore has been developed. This company is preparing to put in a large head frame and electric hoist, and do much development on the orebody in depth. Ore also is said to occur in the C.O.D. ground, which is under the same management. Ore next occurs in good quantities in the Jumbo and the Florence, and then is carried farther on the circle by the Combination, the January and the Mohawk, and then still farther by the Red Top vein almost up to Columbia mountain. George Wingfield is doing considerable development in the Laguna and the Booth claims, and a diamond drill is prospecting the Berkeley claim for ore lying under Columbia moun-

[1]The panned ore is quite rusty, and also on account of its rusty character, free gold is not readily recognized when first such specimens are shown to a newcomer at Goldfield.



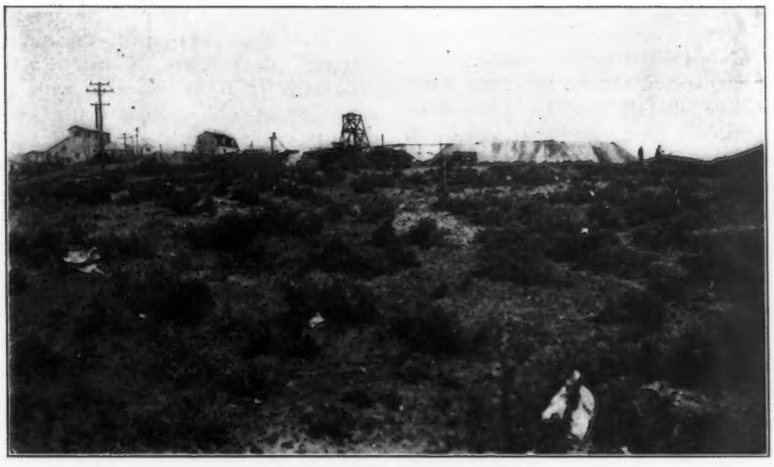
KINKEAD MILL., GOLDFIELD, NEV.

tain, but as yet little ore has been found in that region. On the other side of Columbia mountain are the Sandstorm and Kendall, where the original strikes were made. The ore extends onward in the Conqueror claim, and then makes a jump to the Great Bend property, near Diamondfield, whence it extends on through the Daisy ground to the Black Butte property, where is the farthest extension of pay ore in the northern part of the district. Some prospecting has been done to the north, but little encouragement has been found there.

The producing mines at present are the Combination, the Florence, the Mohawk, the Red Top, the January, the Jumbo, the Sandstorm and the Kendall, at Goldfield; and the Great Bend and the Black Butte at Diamondfield.

As has been previously mentioned, the country rock is quite soft, and so is the ore in most places; as a result drifting is costing only $5 to $8 a foot. Shaft sinking costs from $16 to $20 a foot for two-compartment shafts, 4x7 ft. in the clear, and timbered with 6x6-in. sets, placed 5 ft. apart and lagged with 2-in. planks. It is expected that $10 ore will be mined at a profit when occurring in good large ore-bodies, and when large mills are used in treating the ore.

NEW WESTERN REDUCTION MILL, GOLDFIELD, NEV.



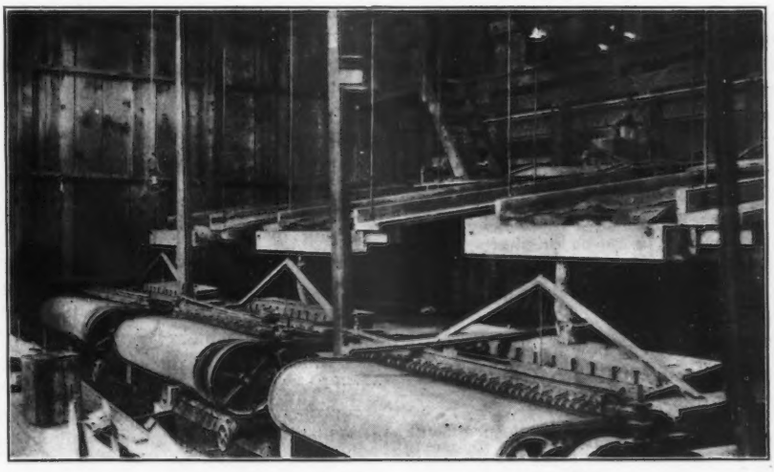
JANUARY MINE, GOLDFIELD, NEV.

The milling of the sulphides is a problem. The oxidized ore contains free milling gold, and also some sulphides. All the millmen unite in advocating crushing, amalgamation, concentration and cyaniding the tails. All the mills except the Kinkead mill use stamps to crush the ore. The Kinkead mill, which is to treat Sandstorm and Kendall ores at first, will soon be in commission. Three Kinkead crushers are to be used for reducing the ore. The pulp is then to be passed over amalgamating plates suspended over three vanners, which concentrate the sulphides in the pulp. The tails are to be cyanided. At the new Western mill, which is run on a custom basis, the ore after being crushed and sampled by means of two Vezin samplers, cutting out 1/10 each time, is fed to a 5-stamp battery, the stamps of which weigh 900 lb., and then concentrated after being classified. The sands are concentrated upon a Wilfley table, while a Frue vanner treats the overflow. The ore fed to the stamps is crushed to about ¾ in., and in the battery is reduced to go through about 30-mesh, a slotted punched screen being used. From 70 to 80 per cent. extraction is said to have been made by concentration and amalgamation. The company is intending to install a cyanide plant for treating the tails. The present capacity of the mill is about 15 tons in 24 hours.

There are two other mills in the camp, viz. a 20-stamp mill at the Combination, where about 70 tons of ore are treated per day, and the American mill, where about 12 tons per day are treated by two Nissen stamps. At both of these amalgamation, concentration and cyaniding are used. The sands are percolated; at the American mill the slimes are treated by agitation and filter pressing; at the Combination they are treated by agitation and the Butters filter process. The Frank cyanide mill is not yet completed, but probably will be this summer.

The Goldfield ores consist of silicified andesite, dacite, or rhyolite (according to the enclosing rock, in which the vein occurs). The original ore is a sulphide, carrying mostly fine-grained pyrite. Much of this sulphide occurs even in the ore above the water level. Some of the ore is free milling. At present a saving of over 90 per cent. is being made on the oxidized ores.

There are two plans of treating the sulphide ore; one has been worked out and installed by F. L. Bosqui at the Combination; the other is being worked out by Wallace Macgregor, who treated similar ores at the Congress mine, Arizona. Bosqui's method consists in sliming, by Abbé tube mills, the tailings



VANNERS WITH AMALGAMATING PLATES SUSPENDED OVER THE VANNERS.

from the Wilfley tables and treating them by the Butters process. This scheme has not been put in operation at the Combination as yet, but it will be soon. From laboratory tests Mr. Bosqui thinks that the tails from the Wilfleys will give as good an extraction when the sulphide ore is treated as is at present obtained from the oxidized ore.

The process which Mr. Macgregor is working out for the sulphide ores of the Florence consists of stamp-milling oxidized and sulphide ores together, followed by amalgamation on plates to remove the free gold, concentration of the sulphides by vanners, treatment of the concentrates by cyanidation, or by chlorination in case the copper content of the concentrates becomes too high, accumulation of the tails in dams where they are drained and partially dried, subsequent treatment of these tails by roasting and further cyanidation.

Practically all the ore, except that shipped by the Florence (which goes to Kennett, Cal., direct) is bought and sampled at the Columbia Sampling Works at Columbia. The treatment charge on the Goldfield ore varies from $10.50 to $11.50, according to the richness and also the coarseness of the ore. Some of the Goldfield ores airslack and dust badly during crushing. The railroad rates from Goldfield to Mina, Nevada, are about one-tenth more than the rates from Tonopah to Mina. No ore below $30 is shipped from Goldfield, and owing to the high treatment and freight charges the ore generally that is shipped is well above $50 per ton.

Goldfield is a union camp. Many of the miners who were forced to leave Colorado during the Cripple Creek troubles came to the Nevada camps. Here on account of their experience in Colorado they are using a heavy hand in running affairs. They decline to allow the mine owners to erect change houses in order to diminish the stealing of high-grade ore, which goes on. Several men in Goldfield are getting rich by dealing in stolen ore. All the trades are unionized. Even the newsboys have their union. The eight-hour day is almost universal.

Miners can get board at about $40 a month, but the price of a room brings board and room up to at least $55 a month. The following is the schedule of wages at Goldfield: Painters and carpenters $6; topmen, $4; hoisting engineers, $5; blacksmiths, $6; miners, $4, except those working in raises or shafts, or on windlass, who get $4.50; machinists, $5 to $6; millmen, $4 to $6; laborers, $4; assayers, $6.

The mills are run now by electric power from the line from Bishop, Cal. The following is the power schedule:

1–10 h.p.	$20.00 per h.p. per month
11–20 h.p.	15.00 per h.p. per month
21–50 h.p.	13.50 per h.p. per month
51–75 h.p.	12.75 per h.p. per month
76–100 h.p.	12.00 per h.p. per month
101–200 h.p.	11.25 per h.p. per month
Over 200 h.p.	10.50 per h.p. per month

The power for hoists is sold at a reduction of 40 per cent. from these rates.

Stulls 9 ft. long, 10 in. at butt, cost $1.35 to $1.50 apiece; lumber and dimension timber $45 per M.; lagging about $12 a cord; coal about $16 a ton; blacksmith coal 3c. per lb.; rails 5.5c. per lb. for 12-lb.; 6.5c. per lb. for 8-lb.; Truax mine cars $40 at factory, $82 laid down at Goldfield; gasolene, 68 per cent., $4.50; gasolene, 72 per cent., $4.75; drill steel 13c. per lb.; powder, 40 per cent., 15 to 16c.; candles (hard) $6 for 40's; caps 70c. a box; fuse $28 a case (6000 ft.).

The drinking water for Goldfield comes mostly from Rabbit Springs. Other water is pumped from Diamondfield (Highland mine). The Combination mill is supplied from Alkali Spring and some of this water is used in town when the water is short. A 6-in. pipe line is being installed to bring water to Goldfield from Lida, which is about 28 miles distant. The district will then have good water. All the mines will probably strike water in depth.

The ground at Goldfield stands well above water level; how it will do in large stopes below water level is problematic.

Near Diamondfield certain of the mines have some telluride ore. The Great Bend is remarkable for a telluride of iron which occurs there.

Treatment of Silver-Lead Tailings by the Cyanide Process.

BY ERNEST J. SWEETLAND.*

The Winters mine of which I assumed the management in April, 1905, is favorably situated on the crest of the Pine Nut range, in Douglas county, Nevada, at an elevation of 8500 ft. above sea level. The mine consists of a well defined fissure vein in slate ranging in width from 3 to 10 ft., and is worked through four tunnels, driven on the vein, the lowest of them opening the vein at about 400 ft. below the surface. The value of the ore is principally in lead and silver, which are, so far as yet exposed, in the oxidized form. Bunches of galena, however, are occasionally encountered; this, together with the shoots of high-grade carbonate ore, which are of common occurrence, is shipped to the smelters.

It has been the custom at the mine to treat the low-grade ores, which remain after sorting out the shipping ore, by crushing in quadruple-issue mortars, using a 12-mesh iron wire screen, and passing the pulp over New Standard concentrators; the latter have proved in practice to remove a higher percentage of the lead which exists as carbonate than would naturally be expected. When the tables are properly adjusted, the galena (some of which is disseminated throughout the entire orebody) is found in the outer streak of concentrates, practically pure. Following this is a well defined streak of lead carbonate, which runs well in lead and silver, almost free from sand. Inside of this is a darker streak carrying lead and silver and some sand, the percentage of which gradually increases as it approaches the tailings-end of the table. These streaks were all carefully assayed in order to find the point at which it was most economical to separate the concentrates from the tailings. These assays showed that the point of economy was found at about the center of the streak last mentioned. From the tables the tailings are run into one of three reservoirs and allowed to settle.

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THE CYANIDE PLANT.

When I was placed in charge of the property the cyanide plant was already built, but had not been run. It seemed strange to see a cyanide plant erected for the treatment of tailings from silver-lead ores; especially since I knew that the tailings were not of high grade and contained some base metals besides the lead. The plant does not present any unusual features. It consists of four leaching vats, each 17 ft. in diameter with 4-ft. staves, fitted with a false bottom made of slats covered with a layer of burlap and 6-oz. duck. The burlap and duck are held in place by a ¾-inch hemp rope driven in a groove between the staves and false bottom. There are two 10x10-in. bottom discharge doors in each vat, through which the residues are discharged by sluicing. The leaching vats are connected to two collecting tanks by a double line of 1½-in. pipe in such a manner that solution can be run from any leaching vat into either collecting tank. From the collecting tanks a 1½-in. pipe line leads to the zinc-boxes. There are 16 circular sheet-iron boxes 16 in. in diameter and 18 in. high, each provided with a screen 2 in. from the bottom and a baffle-board to direct the flow under the screen. The boxes are assembled in two rows of eight each, and each row is connected with one of the sump tanks by a 1½-in. pipe line. This would seem a very small zinc-box capacity for a plant treating silver ores, but I found it to be ample. The solution after reaching the sumps is returned to the stock tanks by a Gould's rotary pump having a 2-in. suction and 1½-in. discharge, actuated by a 3-h.p. Fairbanks-Morse gasolene engine. I have found the average gasolene consumption to be about 5 gal. for every 100 tons of solution pumped to a hight of 37 ft., which at price of gasolene in our locality, viz., 37c. per gal., makes the cost of pumping $1.85 per ton.

The plant was originally designed for direct filling, and as I did not consider the tailings in question amenable to treatment by this method, I at once proceeded to make such changes in the plant as

would be necessary to enable me to fill the vats with dry tailings from the reservoirs. The main change necessary to accomplish this object was the construction of a bridge, or runway, over the vats. The floor of the bridge was built of 2x4-in. lumber laid on edge with 2-in. spaces between them. The vats were filled with a wheeled scraper. My experience has proved that wherever this method of filling is practicable it is much more economical than hauling the tailings to the vats in carts or wagons; it is especially adapted to cases where the material is to be hauled but a short distance. The scraper used in this case was of one-third ton capacity and was provided with an automatic shut-off gate to prevent losing part of the load while going from the ponds to the vats. I found that one man with a pair of horses could easily fill and level a 25-ton vat in six hours, hauling from 200 to 500 feet.

CHARACTER OF THE ORE.

The best idea of the peculiar characteristics of the ore can be given by recounting, in brief, the tests made upon the tailings to determine what system of treatment would be most effective.

The tailings averaged 1.25 per cent. lead and 0.11 per cent. copper, together with traces of zinc, antimony and arsenic. Consequently, besides containing considerable lead the tailings also contained a troublesome amount of copper. The copper was largely in the form of carbonate, which is readily attacked by potassium cyanide, especially in a strong solution. The result of a large number of assays on samples from different parts of the ponds showed the average value to be $0.41 in gold and 7.6 oz. silver per ton.

Those who are familiar with the cyaniding of silver ores are well aware that a strong solution is usually necessary to dissolve the silver, and it would appear that if a solution of sufficient strength to extract the silver were applied to an ore containing the percentage of lead and copper above noted, a prohibitive amount of cyanide would be consumed. Fortunately a peculiarity was discovered in the tailings that made it possible to treat them without excessive consumpion of cyanide: this peculiarity was that the silver existed largely as cerargyrite, or chloride.

It is well known that chloride of silver is more readily attacked by potassium cyanide than the silver compounds having a sulphur radical, and the subsequent tests showed that in this case a fair percentage of silver could be dissolved with a solution so dilute as to have little effect upon the salts of copper and lead. The so-called "selective action" of cyanide was very clearly illustrated in these tests.

LABORATORY TESTS.

The tests were made on 100-lb. lots of the tailings in a barrel plant. The plant was made double so that two experiments could be carried on simultaneously. In place of the miniature zinc-boxes often employed in test plants I arranged to have the precipitation take place in large beakers, so that when the tests were finished the precipitates could easily be cleaned up without loss, refined and melted into a little bar as a check against the charge and discharge assays. Tests made on small samples of tailings showed that an amount of lime equal to 4 lb. per ton was necessary to neutralize the acidity, so that amount was used in all the large tests.

Test No. 1: An amount of solution equal to the weight of the ore (100 lb.), testing 5 lb. KCy per ton or 0.25 per cent. was used in this test. The ore was soaked for 12 hours and then continuously leached for 84 hours. The solution was tested for KCy with silver nitrate solution every 12 hours. It was found that the solution gradually weakened until after about 48 hours contact only 1 lb. free KCy per ton remained in the solution. During the 60 hours which followed the strength remained constant at 1 lb. per ton without further consumption. This phenomenon was not due to the cyanicides all having been neutralized by the 4 lb. of cyanide consumed; but to the fact that the remaining cyanicides had almost no effect on a solution so dilute as 0.05 per cent. The percentage of extraction in this test was 59.6; but the consumption of cyanide was excessive.

Test No. 2: The conditions governing this test were the same as in No. 1, except that a solution of 0.15 per cent., or 3 lb. KCy per ton was used. The percentage of extraction was 56 and the consumption 2.7 lb. per ton; a material improvement in the consumption with only a slight decrease in the extraction.

Test No. 3: Conditions the same as in the above tests, except that a solution of 0.125 per cent., or 2.5 lb. KCy per ton was used. The percentage of extraction was 57.3 and the consumption only 1.7 lb. KCy per ton; a still further improvement in consumption without materially affecting the extraction. I attribute the slight improvement in extraction over No. 2 to the fact that the tailings were in slightly better condition when put into the vat.

Test No. 4: Conditions the same as in the above test, except that a solution of 0.07 per cent. or 1.4 lb. KCy per ton was used. The percentage of extraction was 47 and the consumption 1.1 lb. per ton. This test shows a further saving of cyanide; but the extraction is materially affected. This indicates that the strength of solution has been reduced beyond the point of economy.

A fifth test was made with a solution of 0.1 per cent, or 2 lb. per ton, which resulted in an extraction of 57 per cent. and a consumption of 1.6 lb. KCy per ton. From this and subsequent tests I arrived at the conclusion that 2 lb. KCy per ton was practically as effective as a stronger one, and that a weaker one could not be used without materially decreasing the extraction. I also found, by taking assay samples from the tests at regular intervals, that the cyanide took effect on the silver immediately when it was brought in contact with the tailings. In one test in which a 2-lb. solution of cyanide was used the solution assayed 0.8 oz. silver per ton as soon as it could be drawn off from the charge, and the effluent solution gradually increased in value until the maximum had been reached after about 30 hours contact. It then slowly decreased in value to the end of 90 hours, after which 24 hours additional contact treatment resulted in a further extraction of only 0.3 oz. per ton of ore, which showed that the extraction could not be economically improved by increasing the time of contact beyond 90 hours. Of course the length of time necessary would be modified by the amount of slime in the charge.

In the above tests it is interesting to note: (1) On account of the selective action of cyanide for chloride of silver, practically as much is dissolved by a solution of 0.1 per cent. KCy as by a stronger solution, while the base metals are not as strongly attacked by the weaker solution; (2) the extraction cannot be materially improved by continued contact with a weak solution.

ACTUAL WORKING OF THE PLANT.

After the strength of solution, amount of lime, time of contact, etc., were worked out on a laboratory scale, the working of the material on a mill scale was an easy matter, as it simply involved the application of the principles found to be correct, on a larger scale. It was found in practice that the percentage of extraction and cost of treatment checked with the figures obtained in the laboratory. The vats were filled with a wheeled scraper as previously described. As soon as a vat was filled and leveled it was charged with solution from below. Immediately the solution covered the surface of the charge the flow was stopped from below and turned on the top and leaching commenced at once, omitting the customary soaking period. The solutions were allowed to percolate unrestrained; but when a charge leached too freely, owing to lack of slime, it was found advantageous to cut down the flow, as the passage of too great an excess of solution increased the consumption of cyanide.

The solutions were frequently tested for total and protective alkalinity and percentage of cyanide; in this, as well as in most other cases the effectiveness of precipitation depended largely upon these factors. As long as the protective alkalinity was kept above 0.01 per cent. there was no difficulty on that score. The zinc-box tails rarely assayed more than a trace when the alkalinity was right and the strength in cyanide was over 0.05 per cent., but the percentage of precipitation dropped off rapidly as soon as the strength fell below that point. An interesting fea-

ture of the precipitation which I observed in this case, and which I have not seen elsewhere, was that the solutions as they entered the zinc-boxes yielded a heavy brown precipitate when treated with sodium sulphide; but the sump solutions did not show any reaction with that reagent so long as precipitation was perfect, except a white gelatinous precipitate of zinc sulphide. If, however, on account of deficiency of cyanide or alkali, the precipitation was poor, it was promptly detected by applying this simple test to the zinc-box tails, as the escaping metal produced a precipitate, more or less dense according to the amount of metal escaping precipitation. This rapid test was found to be very valuable at the plant as it greatly reduced the amount of solution assays necessary. After some practice one could quite accurately estimate the amount of silver in the solution by the density of the precipitate. When the solutions reached the sumps they were re-standardized and returned to the stock tanks to be used over again. As base as the tailings under treatment were, the solution did not become sufficiently fouled with repeated use to make it necessary to reject them.

The clean-up of the zinc-slimes was effected in the usual manner, the zinc which passed an eight-mesh screen being dissolved with dilute sulphuric acid, while the long zinc was returned to the head boxes to be further consumed. A redwood tank 4 ft. in diameter, with 3-ft. staves was used for the acid treatment and gave excellent satisfaction. From this and previous experiences I am of the opinion that lead-lined tanks for acid treatment are an unnecessary extravagance, and one which is impossible in cases where the slimes contain mercury.

When the product after refining was finally melted into bullion, the bars were clean and bright and about 750 fine, which is as fine as bullion usually is from tailings practically free from base metals.

In cement mixtures, fine sands require a larger percentage of water than coarse sands to produce the same consistency of mortar, the required percentage varying with the fineness of the sand.

California is resuming some of its early importance as a producer of lead, through the re-opening of the Cerro Gordo mines of Inyo county. The Great Western Ore Purchasing and Reduction Company is erecting a 150-ton furnace at Keeler and will treat the slags left there by the early smelters, as well as ore from the mines.

Present practice with modern boilers shows that the average evaporation amounts to from 3 to 7 lb. of water per square foot of heating surface per hour. Until this evaporation is substantially increased to 12 or 15 lb. per square foot of heating surface per hour and the total heat loss so reduced that it will not exceed 20 per cent., it is safe to consider that our boilers have not reached that efficiency of design which is possible and essential to economical practice.

The De Bavay Process.

In previous issues we have referred several times to the Potter and Delprat flotation processes, which have been so successful in the treatment of the mixed sulphide ore of Broken Hill, and have also mentioned a third process of this nature, viz., the De Bavay process, which differs from the others by not employing sulphuric acid. The De Bavay Treatment Company has just completed a small plant at the North mine, Broken Hill, and claims to be effecting a higher recovery than either of the other processes, while producing a higher grade of concentrate. This process, like the Potter and the Delprat, will not treat slime, nor give good results on particles larger than 0.5 mm. In his patent specifications De Bavay states that material from 40-mesh to 80-mesh size is the most suitable.

In the De Bavay process the crushed ore or pulp is gasified with carbon dioxide, ordinary chimney gases being capable of use for this purpose. The gasified ore is then spread in a thin sheet upon the table whereon the flotation is effected. There is a good deal more plant required in connection with this process than in connection with either the Potter or Delprat process, and its operation lacks the simplicity of those, wherefore its cost per ton is likely to be greater. On the other hand, the De Bavay process appears to be more delicate than the others, as a result of which galena is floated to less extent. In some cases this may be a draw-

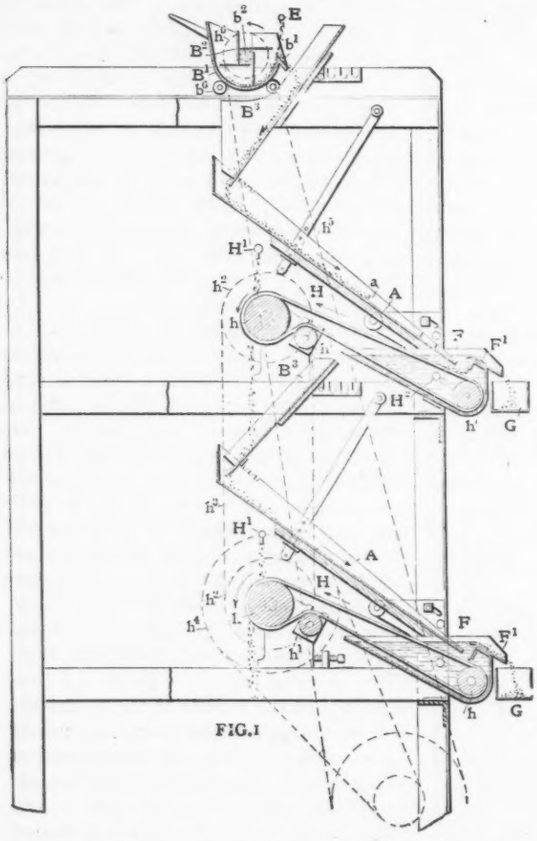


FIG. 1

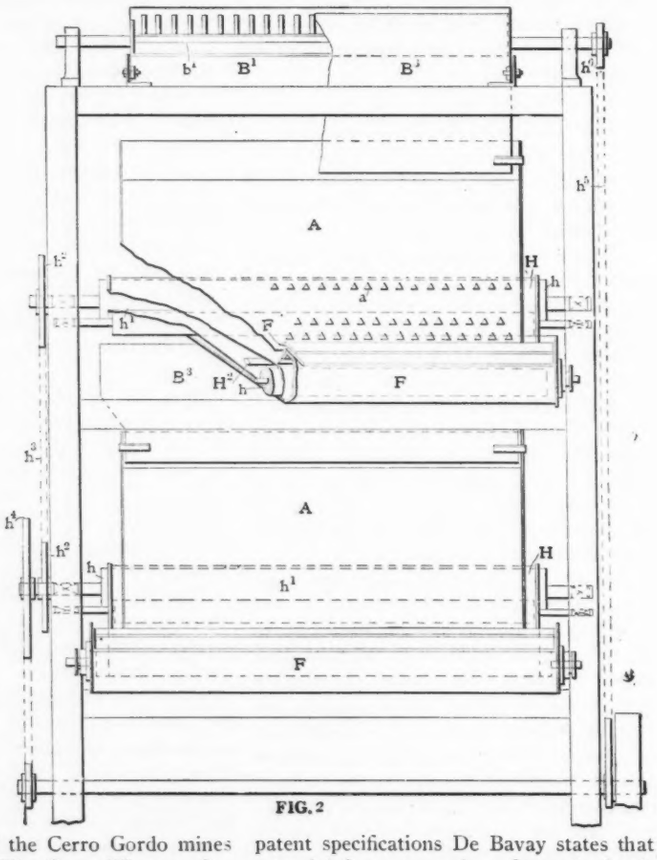


FIG. 2

back, but in other cases it will probably be an advantage. The distinct advantage of the process, however, is its apparent ability to produce a higher grade of zinc concentrate. It still remains to be seen how the process will work out on a large commercial scale. The work so far done at Broken Hill indicates the possibility of extracting nearly 100 per cent. of the zinc and about 75 per cent. of the lead and silver in the form of a concentrate, assaying 44 to 46 per cent. zinc, 11 to 14 per cent. lead, and about 15 oz. silver. The following description of the apparatus employed in the De Bavay process is based on the specifications of British patent No. 25,858 of 1904:

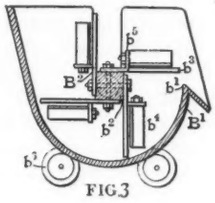


FIG.3

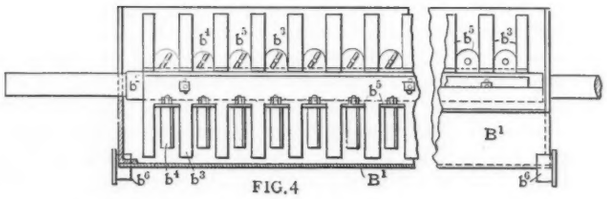


FIG.4

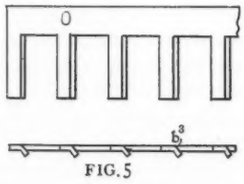


FIG.5

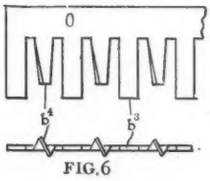


FIG.6

tongues as *a*. At the upper part of the apparatus is a cistern *C*, in which the sifted ore is chemically treated, delivering to a washing bin *D*. Feed hopper *B* has a water jet in its outlet which leads to spouts *b* at its lower part which deliver to a semi-circular trough B^1 having a rotary feed device B^2 therein and provided with a longitudinal feed lip b^1. The rotary feed device B^2 is constructed of a square shaft b^2 having a toothed feed blade b^3 secured to each of its sides and also between each of said teeth another curved or twisted distributing tooth b^4, the pitch of which is capable of adjustment by being pivoted on a lug b^5 secured to the side of shaft b^2; also the hight of lip b^1 is capable of adjustment by the semi-circular bottom of trough B^1, being seated on rollers b^6, and when set the trough is secured at the requisite position.

From the longitudinal lip b^1 the ore, saturated with water, is fed in a regulated quantity into a chute B^3, and thence to the inclined table *A* in a thin paste. *E* is a pipe fed from any convenient source for supplying a small stream of water sufficient to wash the ore over the lip b^1 and keep it clean, to insure of the ore being fed in an even film, while the distribution of the ore stream on the table is aided by the tongues or tags *a* when employed. The lower part of table *A* dips into a shallow trough *F*, which is filled with water to the level of an overflow lip F^1; outside of this ledge is a gutter *G*, leading away at a downward inclination to a suitable bin, the upper end of this gutter being slightly below the level of the ledge of trough *F*, to provide an overflow therefrom, while the ledge F^1 is made in the form of a sliding plate, secured by adjusting screws, in order that the hight of water in the trough may be regulated to a small extent.

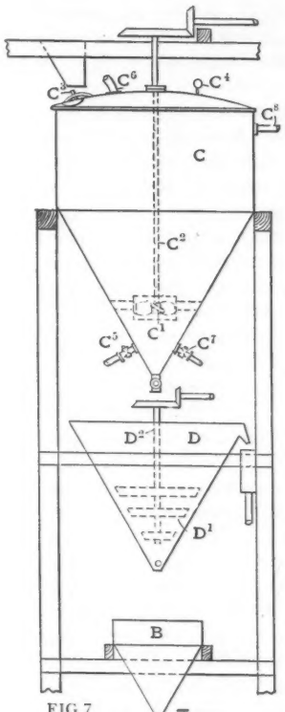
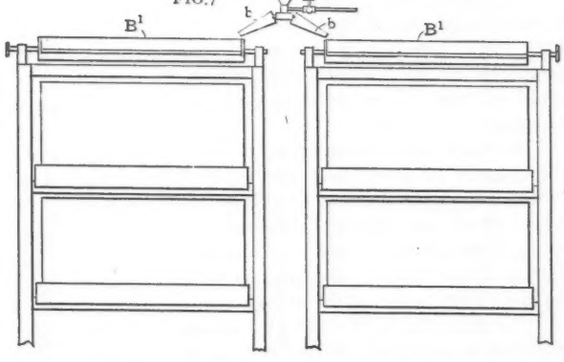


FIG.7



In trough *F* under the lower end of the table *A* the front part of an endless traveling belt *H* is arranged, which table is carried on rollers *h h* and a tension roller h^1 in such a manner that its top surface forms an inclined plane leading from under the water at front of trough to over its back edge and therefrom delivering the materials, aided by a stream or spray of water from a pipe H^1, to a chute B^3 leading to the inclined surface

Fig. 1 is a sectional side view, and Fig. 2 a front view partly in section. Fig. 3 is an end sectional view, and Fig. 4 a longitudinal sectional view, both drawn to a larger scale, of the feed appliance for the apparatus, and Figs. 5 and 6 are details of alternative forms of combined distributors and feed blades therefor. Fig. 7 shows a general view of the apparatus as arranged below the ore-preparing and washing appliances.

The apparatus consists of an inclined table *A*, supported so that it can be adjusted at an angle to the horizontal, usually about 35 deg., and preferably made of metal or other non-absorbent material, and if desired having projecting from its surface one or more lines of distributing

of another table A of the same kind, the construction being repeated as often as may be necessary. H^2 is a perforated water pipe for spraying upon the lower roller and under surface of the endless traveling belt to keep the surfaces clear of precipitated ore. In Figs. 1 and 2, the back and larger rollers h of the traveling belts H are shown furnished with pulleys h^2 connected by a belt h^3, and the lower roller spindle has another pulley h^4, to which motion is imparted. h^5 is a belt imparting motion to a pulley h^6 on the spindle of the rotary feed appliance B^2.

The cisterns C are connected up by pipes in pairs, each cistern being provided with an agitator C^1. Also each cistern is furnished with feed doors C^3 and a pressure gage. C^5 is a gas supply, and C^6 a gas outlet pipe, C^7 water supply and C^8 water outlet pipe from cistern; by such an arrangement of pipes, the gas after being utilized in one cistern may be fed to the other cistern. The cistern D is also furnished with stirrers D^1.

The ore is fed from the cisterns into the feed appliance B^1 and thence to a chute leading to table A in a thin pasty condition, and is then carried down by a small stream of water in a thin film, which is evenly distributed thereon by upstanding tags, and finally is led to the surface of the water in trough F. Most of the particles capable of flotation are carried along the surface of the water in the trough F into the gutter G and thence into a bin. The particles which do not float sink in the water in trough F and are received upon the belt H, which carries them upward and delivers them over its back edge, aided by a stream of water from pipe H^1, to a shoot feeding another table A, and so on until the required separation is effected.

The length and inclination of the table, the quantity of water used, and the hight of the adjustable lip, and of the step or ledge when used, should be regulated so as to bring about a speed necessary to deliver a thin film of the ore upon the surface of the water in the trough and to carry a thin film of the particles capable of flotation, which it is desired to separate, along such surface and into an outer gutter. The dimensions and adjustment of the traveling belt and the breadth of the trough should be sufficient to enable all, or nearly all, the particles not capable of flotation to sink, and be delivered to the next table. The ascertainment of these matters can be easily made by a few trials.

Helen furnace, at Clarksville, Tenn, uses as fuel about 85 per cent. of coke and 15 per cent. of raw bituminous coal. It is the only blast furnace in the South using any raw coal; and the use of bituminous coal in the furnace is quite rare in this country. Three furnaces in the Hanging Rock region in Ohio also use a mixture of raw coal and coke.

Mining in China.*

BY J. H. CURLE.

No gold is at present being produced by foreign enterprise in China. The Empire's yearly yield of this metal is assumed—on slender data, it seems to me—to be about $7,500,000, of which the greater part is from alluvial deposits. The chief placer fields of China are at Moho, on the Siberian border of Manchuria, and on he Thibetan border of Szechuen. Quartz mining is yet in the primitive stage. When in Pekin I was told, on what I consider reliable authority, that a quartz mine in Mongolia, worked in the Chinese fashion, produces about $400,000 a year. Reports speak of various small quartz mines in Mongolia, Manchuria, and in Szechuen, but when the exaggeration of lay witnesses is sifted out one is left with the impression that China is not an attractive field, geologically, for gold-mining. The best-known quartz mines in the country are Chao Yuen and Ping Tu, in Shantung, which belong to the same proprietor. Several times British and Americans have tried to buy these, but so far without success. They have been wretchedly worked by their Chinese owners, and, if purchased, a large sum would have to be spent on their equipment and development. It is, of course, not certain, until examination is made, whether these mines are worth what they are reputed to be; but I should think that Chao Yuen (as it was described to me some years ago by an engineer who had sampled it) is at least likely to turn into a valuable concern. The chances of getting these, or, indeed, any other mines in China, are now lessened by the strong anti-foreign feeling with which most of the officials are possessed. The political feeling now vents itself in the cry of "China for the Chinese, and no more concessions to foreigners." So far as mining is concerned, it would be probably incorrect to say that no foreigners can now acquire mines; but the official idea is that, in order to hold the balance of power, the Chinese must hold at least half the shares in any mining company that is in future to be constituted. It will be seen that this restriction, unless it can be got round, will prohibit foreign capital going into Chinese mining enterprise, for clearly the control of a mine must always rest with those who finance it; they, naturally, are not going to be satisfied with equality in the direction of affairs. Again, it has to be noted that mines, gold or other, acquired from the Chinese, will be undeveloped, and I hope there are no people in Britain who would contemplate giving the vendors one-half the shares in a company to develop an unproved mine. For such a venture at least 80 per cent. of the total capital should be represented by cash available for development, and it follows naturally that the vendor and the middleman must be content with the balance.

There is still another drawback. The Chinese Government is likely to demand a biggish share of a mine's profit. In one case I heard of, where the flotation of a mine was proposed, the Government insisted that not only was the native owner to receive one-half the shares, but that, after a 6 per cent. dividend had been paid, the Government was to receive 25 per cent. of the balance. Clearly, such financial demands are impossible. Unless they are modified the Government will defeat its own ends; the Chinese cannot develop their own mines, foreigners will not venture their capital under such restrictions, and China will make no progress at all in this branch of industry.

Personally, assuming a different condition politically, the type of mining venture which would attract me in China, rather than gold, is coal. I have been greatly impressed with the immense market there is for this commodity, especially in northern China. In addition to a very cold climate for most of the year, you have the fact that most of the country is barren of wood fuel of any sort. Add to this a vast population, with good means of communication, and the sale of coal at a good price is a foregone conclusion. The successful history of the foreign-owned Chinese Engineering and Mining Company can be studied by anyone. Its coal mines, granted by concession in the days before anti-foreign feeling had arisen, are near Tientsin; it produces at present 3000 tons a day, which is sold with ease. It owns a fleet of steamers, landed property at all the ports, and a reserve of cash which alone are fine security for the debentures. I was told by the management that it is intended to increase the plant and bring the output, by 1908, up to over 5000 tons a day. Granted sufficient coal, and, so far as I know, there is no lack of this, the future of this concern is very sound.

Another interesting coal venture is that of the Pekin Syndicate, whose mine in the province of Honan I inspected. I had believed that this venture included also large iron deposits, and that a great smelting and pig-iron producing industry was about to spring up at its touch. This is not the case. The Syndicate certainly owns iron deposits, and further vast coal areas, but these are in the Shansi province. They have not yet been developed, and the Chinese Government is going to block their development except under Chinese auspices and ownership. Let us write these off as not, for the present, realizable. The Honon concession, however, still remains, and as this is about 15 miles long and two miles wide, and is supposed to be totally underlaid by a wide seam of good coal, the asset ought to be a substantial one. This concern has excellent

*From the London *Economist*, Aug. 4, 1906.

local management, and the surface plant of the colliery is laid out just as it should be—that is, it is most substantial and suitable for the handling of a big output. The shaft was duly sunk to some 600 ft., and there cut a wide seam of coal. Just under the seam a heavy flow of water was met, which the pumps could not handle, and pending the ordering and installation of a more powerful pump, the lower workings remained under water. It was at this time I visited the mine, and was not, therefore, able to see the coal *in situ*, but I saw on the surface that which had been cut in the shaft. This is a good coal—a semi-anthracite, but most effective for firing. I also saw more of this coal when visiting some native mines seven miles distant where the seam is shallower, but also of good quality and exceptional width. It is my belief that there will be a great local demand for this coal, and that even though the colliery is so far from the coast its locality will not really interfere with its profit-earning capacity. Under normal conditions I believe this will be a most profitable colliery. The abnormal condition at present is the hostility of the officials, and of many of the people, to all foreign ventures, and a boycott of the colliery—if sufficient coal could be produced by native mines—would no doubt be attempted. On the other hand, I think that the native mines cannot nearly supply the local demand, and that when it is seen that the Pekin Syndicate Colliery is able to sell a good coal at a considerably reduced rate much of the opposition will be withdrawn. The Chinese are practical, and where their pocket is concerned are amenable to reason; besides, they are, all things considered, about the most peace-loving people in the world, and, if left alone by the officials, their hostility would vanish in a night. Of course, the Pekin Syndicate. like most popular Stock Exchange ventures, is over-capitalized, even considering its strong financial position. A colliery, after all, is a prosaic venture. I admit it will probably be a highly profitable colliery, but I cannot recommend the shares at present prices.

I have devoted as much space to the political as to the mining outlook in China, but the political situation really determines the other, so far as we are concerned. At present the Chinese field is not attractive for mining capitalists.

Reopening Filled Ground.

BY ROBERT B. BRINSMADE.*

At Tombstone, Arizona, in the Contention mine, there is an interesting example of an efficient system for the penetration of old filling. The Contention vein is a nearly vertical fissure in a porphyry dike. The rich ore was excavated to a width of 6 to 15 ft. and as far down as the water level in the eighties. Anything not yielding $20 a ton was left behind, either unbroken or in the stope as a filling. The new cyaniding mill of the Tombstone Consolidated Company can make a good extraction for $2 a ton, consequently it has now become profitable to remove the old filling.

To accomplish this, the old drift is entered by a cross-cut from the new 4-compartment pumping shaft (sunk by the new owners about 200 ft. west of the caved Contention shaft). This work is above the water level. The drift sets are 8-in., square timber. The posts are set 3 ft. 6 in. apart at the cap (Fig. 1.) with 2 in. per ft. outward batter; the cap and sill centers are 7 ft. 8 in. vertically and 5 ft. 9 in. longitudinally. Starting at set c, already completed with breast boards in front at K, the first procedure for a new set is to drive with sledges 3-in.x4-in.x8-ft. spiles (m) over the caps and under the bridge (g) into the filling ahead; these top spiles are sharpened with a chisel edge so as to advance with an upward inclination. The next step is to drive several spiles (n) under the side bridge (q) at its top, so that the boom (a) can be inserted after removing some top breast boards (k) and the filling behind them. The boom (a) is 8 in. sq. and 12 ft. long. It is placed centrally under cap of set (c) and rests on post e, in order to support the 8-in. x 8-in. x 4-ft. cross-piece (d) under the ends of the top spiling. The block (h) is of such thickness as to hold the rear end of the boom at such distance under the cap of set c_1 as is necessary to keep the ends of spiles at the desired hight.

When the boom is in place the row of breast boards (f) is begun. These boards may increase in length from top to bottom so as to preserve the proper distance apart of the side spiling. Enough filling is first removed ahead of (d), to give room for the top breast board, whose ends are supported against the posts of set (c) by 2-in. x 4-in. pieces (not shown in the figure), made about 6 ft. long, to allow sufficient clearance ahead over the exact space required for the insertion of the next set c_2, just 5 ft. 9 in. ahead.

The other breast boards of row (f) now quickly follow until the floor is reached and the whole space from k to f is cleared of filling. The set c_2 could now be inserted were it not for the 2x4-in. end braces of f. To render these superfluous, a post (e), is wedged tight under the boom at (d) and short 2x4-in. central braces (s) are placed between center of boards (f) and post (e). The 2x4-in. end braces of (f) can now be removed and set c_2 inserted. The top and side bridges of the new set (corresponding to g and q) may then be put in, and when they are wedged tightly all around against the spiling, and the collar braces d placed, the boom and its supports are knocked out and the set is finished. Where the vein is only one set wide, the driven side spiling can often be omitted.

If all goes well a set can be put in by two experienced miners in two 8-hour shifts; with spiling driven on both sides, it may take longer. The secret of success is to keep the filling constantly caught up, so that there is no chance for a run to start. Should the boom crack under un-

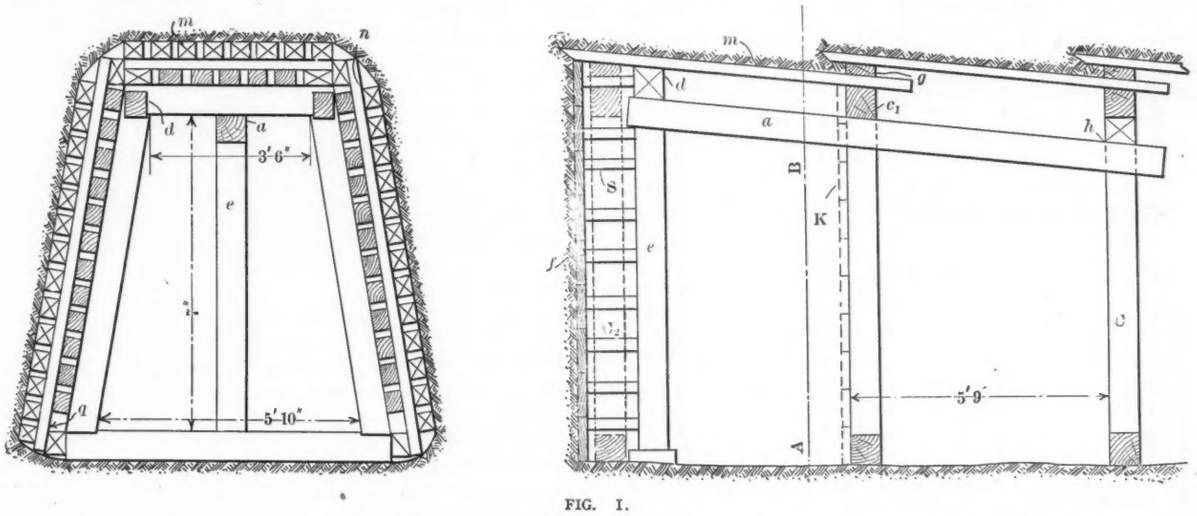


FIG. 1.

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usual pressure, as often happens, so that the top spiles begin to sink, the cross piece (d) is forced back into place by jack screws, set under its ends, and a new boom inserted. When the new set c_2 breaks from extra pressure and the filling rushes back into the open space behind it, the whole operation must be repeated, beginning at set c_1 as at the start.

Not only is this system applied to the opening of abandoned drifts, but also to

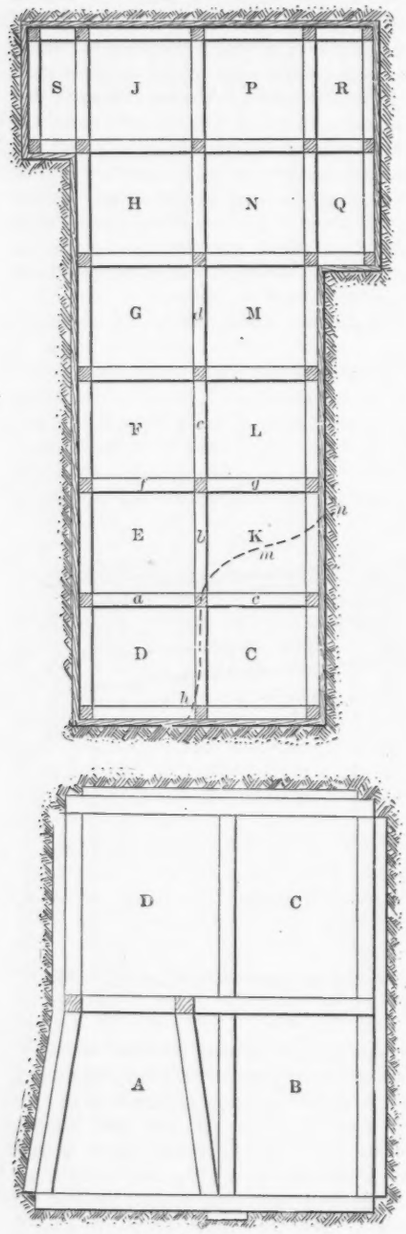

FIG. 2.

old stopes. For, owing to the fact that the barren hanging wall would shell off and run down with the ore, the removal of the filling by letting it sink through a chute into the drift, as is often practiced, is here not feasible. To reach the first flow of the stope, it would not do to remove the overhead lagging of the drift, as in solid ground, for it would start a dangerous run of the filling.

To obviate this danger, space enough for a square set of 8-in. timbers (whose centers are usually 5 ft. 9 in. square by 7 ft. 8 in. high) is first excavated in the solid hanging wall at B (Fig. 2) and the first floor level reached by cutting out for another square set C above, in the hanging wall. The first-floor filling is now attacked sideways from C, by driving spiling as described for drifting, and a set D, in this filling, directly above the drift, is thereby secured. From D, it is now easy, by considering the side spiling (a) as breast boards, to put in set E and thereafter continue the stope floor ahead to J, as in drifting. No attempt is made to fit the square sets exactly to the inclined drift sets, but a stope post, when set on a cap, is placed as near as possible to the top of the inclined drift post below.

When the stope is more than one set wide, the whole width can be extracted by running parallel sets, as K-P, to the initial row. This parallel row can be started in two ways. The first is used if the old stope widens out near a raise, or near a body of solid ore on the same vein wall that is to be removed. The start is made from the set in solid ground as at C, and there is thus no difficulty in taking out from K to P; for there is only one side to spile, the spiling b, c, d, etc., being removed as the sets advance. The second way, for the case where the widening must begin from a set in the first row, as E, offers more difficulty. To effect this most conveniently, it is best to put in set K before F. Then it is easy to drive the only side spiling needed at g (for as the original contour is h, mn, e is against rock), through a bridged space, left between the face boards f and the front posts of E.

Should the stope widen beyond two full sets as at Q, R and S, the common square set method of shortened caps on the hanging wall at Q and R, and shortened sills on the foot wall at S, is employed. Except for a gangway, one set wide to the ore chute, the stope sets are filled with waste as soon as possible. For this purpose, the raise C is put through to the level above in order that the needed waste may descend in it. Without filling close behind the excavation, it would be impractical to hold the ground pressure and even now, it is a common occurrence to have a cap break or a set fill up, in the passageway to the chute.

In handling acid water in mines the pipes should be lined with gunmetal or other non-corrosive material. Copper is useful, but the cost is almost prohibitive. One standard pump is lined with hard rubber and acts with considerable success. Another manufacturer lines the water cylinders with lead. For low pressures, pipes formed of wooden staves, about 2 in. thick, asphalted heavily and hooped with iron bands, have been employed.

Recovery of Water in Milling.

BY ERNEST J. SWEETLAND.*

Of the many difficulties which confront the millman in desert regions, the scarcity of water is the most serious one. There are few places in southern Nevada where water is so plentiful that it can be used but once and then run to waste, wherefore an effective system of water recovery is essential to success. The recovery plant used at the American mill in Goldfield is so satisfactory that a brief description will be of interest.

It consists of a V-shaped box 96 ft. long, 6½ ft. wide at the top and 7 ft. deep, tapering to an edge at the bottom. The box is made of two layers of tongue-and-groove lumber, 3 in. wide and 1 in. thick, with a layer of canvas between. This is supported by 4x6-in. timbers at intervals of 3½ ft. which are held from

SETTLING BOX.

spreading at the top and bottom by ¾-in. iron bolts. Every other one is reinforced with a brace of 4x6-in. timber, which is notched into the cross-piece upon which the box rests. These braces proved their value after the box had been in use for a short time, as some of the supports which had not been braced gave way under the strain, and had to be replaced with heavier timber. In order to give the water the necessary fall, the whole structure is raised 8 ft. above the ground, and supported on bents of 6x6 timber 8 ft. apart.

As originally designed, the settling box was only 48 ft. long, and was provided with five baffle-boards, placed transversely at equal intervals. They were made of the same material as the box, and extended from the bottom up to within about 3 in. of the water level. After some experience had shown that the 48-ft. box was ineffective, the baffle-boards were removed and it was tried again. The results were somewhat better; but the overflow was still a little slimy so it was decided to extend the box to twice its

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length. This was done, and, profiting by the experience with the first box, the baffles were omitted in the new one. Two-inch pipes provided with stop-cocks were arranged along the length on the box to provide a means of drawing off the settled slimes.

The method of recovering the mill water is as follows: As the pulp in the mill leaves the vanners it goes to the classifiers, where the sand and slimes are separated. Milk of lime is added to the pulp in the launders leaving the classifiers, which neutralizes the acid in the ore and assists in settling the slimes. The sand is deposited in leaching vats and the overflowing water is conducted to a sump, where the slimes from the classifiers are also collected. The mixture of slimes and water is pumped from here up to the settling-box by a No. 2 centrifugal pump. The amount of sludge passing into the box is about 50 gal. per minute, and contains about 1½ per cent. solid matter. As the water flows from the lower end of the settling box it is clear enough to drink, and is ready to be returned to the storage tanks, from which it is drawn for use at the battery, vanners and classifiers.

Each day the slime is drawn from the settling-box to the cyanide plant, where the values are extracted. The sludge drawn from the bottom of the box contains from 35 to 50 per cent. solid matter.

This system of water recovery possesses many advantages over the methods I have seen used in mills elsewhere. It requires no attention save a few minutes each day.

The Humboldt Smelter, Arizona.

In the construction of the smelter of the Arizona Smelting Company, at Humboldt, near Prescott, Arizona, ground was broken July 15, 1905. In the month of July, 1906, 400 tons of blister copper were shipped. The company also started in September, 1905, the construction of a 500-ton concentrating mill, located near the smelter, which is now in operation and producing concentrates.

The smelting plant was designed for reverberatory smelting, using waste-heat boilers in connection with the reverberatories and California oil as fuel. The combination has proved remarkably successful, and the fuel cost per ton of ore smelted is considerably less than with coke and blast-furnace practice in this locality. It was hoped at the time of designing the plant to be able to run much higher silica than is usually obtained in reverberatory work, and practice has proved this to be feasible, as the slags frequently run, successfully, as high as 49 per cent. silica without unduly slowing down the furnace or increasing the fuel consumption.

The plant was designed and constructed by Cyrus Robinson, consulting engineer, of New York.

Concentration of Silver-Lead Ores.*

BY V. F. STANLEY LOW.

The new mill of the Block 10 Company, of Broken Hill, N. S. W., has given excellent opportunities for the observation of power consumption. As the heavier parts of the machinery are driven by separate electric motors, each of which is fitted with a dead-beat ampere meter, better opportunities are given for noting the power being absorbed than is the case with machinery belt-driven from one main engine.

The power is generated by three Parsons improved parallel-flow compound turbines of 240 h.p. each, directly coupled to the alternator and exciter. Each steam turbine is designed for a normal continuous output corresponding to 160 kw. at the generator. The turbines, to produce this output, travel at a rate of 3000 r.p.m., are supplied with super-heated steam at a pressure not lower than 150 lb. per sq.in., and exhaust into a condenser having a vacuum within 5 in. of the barometer vacuum.

At the present time there are 38 motors in use at the works, and these vary in capacity from 1 to 40 h.p. Most of the motors run at a speed of 750 r.p.m.

When the new mill was being designed the nature of the ore was considerably different from what it is at present, for the lowest levels were not then supplying such large quantities of material. The ore at a depth, although of excellent quality, is finer-grained and more zinky. This necessitates the finer crushing of a larger proportion of the material and consequently the formation of a greater quantity of slimes. The total surface settling area of the whole mill now amounts roughly to 6890 sq.ft. and the volume to 18,920 cu.ft., exclusive of the circulating tanks, which have a surface area of 1055 sq.ft., and a capacity of 14,800 cu.ft. When milling at the rate of 600 tons of crude ore per 24 hours, these settlers are taxed to their utmost capacity.

All slime dressing is done on Warren belt vanners, which do excellent work, and are capable of treating material ranging from the coarsest Wilfley feed down to the finest slimes. The capacity of these tables is large, and the management of them is simple.

The pumps in the main mill and in the vanner extension account for a total of 157,000 gal. of clear water and water containing slimes per hour, but as some of the pumping is done in stages—one pump delivering to another—this does not truly represent the quantity of water and slimes in circulation. When the main mill is working at a rate of about 3300 tons per week the clarified water in circulation for jigging and vanning amounts to about 70,000 gal. per hour, but considerable margin has to be allowed, as this at times is a very variable quantity. Observations in the present mill tend to show that there is an actual loss of 110 gal. of water for every ton of crude ore passing through the mill.

In the list appended, showing the actual power required, the figures have been taken at what may be considered normal conditions. In the case of the reducing machinery the power stated may be considerably increased or diminished according to the size and hardness of material, the rate of feed, and the state of repair and smooth running of the parts. After many trials as to the most suitable size for material, the practice now in vogue is to break the rough material down to about 1-in. or 1¼-in. mesh in Austin crackers before sending it to the rolls. The work of these crackers was at first far from satisfactory, on account of the excessive power required, and from other causes. They are now, however, doing excellent work, and in reducing large material to 1¼-in. mesh, at the rate of 19½ tons per hour, absorb but 25 h.p. each; when breaking to a larger size, with increased capacity, the power required is also increased. It has been found that by making the first reduction a fine one the capacity of the rolls is greatly increased, and that the sudden variations in load are greatly reduced. In the earlier days, when the material fed to the rolls was much coarser than is at present the case, the power required for the rolls was very much greater, the sudden variations in load were excessive, the capacity of the rolls was smaller, and the overloading and consequent switching out of motors was of frequent occurrence. Thus many hours every week were lost in stoppages. Under the present conditions the switches attached to the roll motors for automatically cutting off the current during seasons of overload are seldom called into requisition and the ammeters show that, with regular feeding, there is very little general variation, and that there is almost absolute freedom from sudden variations in the load on the motors. It is also noticeable that when the rolls are screwed closely together their capacity is less, and the consumption of power is greater than when left slightly apart.

The rolls, when crushing average material at the rate of six tons per hour to pass through a screen of 2½-mm. mesh, require about 30 h.p. each. The amount of returns or raffs depends on the type of material, condition of the rolls, size of the trommel perforations, and the quality of the trommeling. The capacity of the ball mills is also affected by the type of material and the degree of fineness to which it must be ground. It has been found that the best results are obtained when care is observed in keeping the mills

*Abstract of a paper in *Proceedings* Australasian Institute of Mining Engineers, Vol. XI, No. 4, April, 1906.

supplied with the proper weight of crushing balls. In a plant which has to deal with variable ores, there is variable wear on the balls, and the best results are obtained when the mills are periodically opened, the crushing steel weighed, and the amount of loss accurately made up. With regular feed there is but little variation in the power required for the operation of the ball mills. There is practically no difference to be observed in the power required for driving jigs, vanners, and Wilfley tables, so long as these machines are kept in good repair.

TABLE OF POWER REQUIREMENTS.

Machine.	Total h.p.
2 Austin breakers	50
4 feed rolls, 4 pairs Cornish rolls, 4 shaking screens, 8 parallel trommels	120
2 lines of countershafting	6
4 coarse jigs	6
4 fine jigs	4
4 Wilfley tables	2
4 ball mills (No. 3 Krupps)	38
24 Warren vanners and 2 lines of countershafting	12
5 centrifugal circulating pumps	60.5
3 centrifugal slime pumps	19
4 elevators	6
Vanner extension centrifugal pump	16
10 vanners and countershafting in vanner extension	5.5
Tangye return pump	4
Total	349

The quality and proportion of the products and by-products from the different mills will vary with the nature of the crude ore and the dressing method adopted. Variations will also take place from time to time in any one mill. An instance may be taken of a mill which has to treat crude ore assaying 14.5 per cent. lead and 17.5 per cent. zinc, making a recovery of about 66 per cent. of the lead contents, and producing a concentrate containing about 65.5 per cent. lead. It is probable that the proportion of products and by-products will be as follows:

Description.	Per cent. by weight	Assay % Pb.
Concentrates	14.5	65.7
Jig tailings	32.2	3.7
Jig middlings	35.8	6.0
Vanner tailings	10.9	6.1
Slimes	2.6	16.2
Slimes	4.0	12.6

The concentrates mentioned above as being 14.5 per cent. of the total weight will also vary with the nature of the ore and with the system of dressing adopted. In the Block 10 mill the concentrates in such an example as has been taken would probably be produced from the various departments in the following proportions: Coarse jigs, 71.5 per cent. by weight; fine jigs, 9.5 per cent.; Wilfley tables, 3.5 per cent.; vanners, 15.5 per cent.

Too much care cannot be taken when jigging to see that the slimes are properly cleared from the crushed material before it reaches the jigs. A case in bad jigging was brought under my notice in which the tailings were very high. Samples of the tailings from the coarse and fine jigs were taken, and these samples were sized and assayed, the result showing that the high jig tailings were due solely to the bad classification at the head of the jig. The following are the figures obtained from the trials made:

Mesh.	Coarse Jigs.		Fine Jigs.	
	Per cent. by weight.	Assay % Pb.	Per cent. by weight.	Assay % Pb.
On 20	12.9	4.6	3.7	5.0
On 40	27.5	2.4	35.5	5.4
On 60	11.1	2.2	14.3	5.4
On 80	22.1	2.4	23.2	5.8
On 100	2.8	2.6	2.7	7.1
Through 100	23.6	12.7	20.6	15.7
Totals	100.0	4.8	100.0	7.6

From the above it may easily be calculated that nearly 62 per cent. of the lead contents on the coarse and over 42 per cent. on the fine jigs is contained in material which will pass through a sieve of 100 mesh. Had the finest material been properly removed in the first place and sent to the slime tables, the jigging as well as the final recovery would have been much improved.

As these figures clearly showed that the classification was at fault, alterations were made, and further samples were taken, with the following result:

Mesh.	Coarse Jigs.		Fine Jigs.	
	Per cent. by weight.	Assay % Pb.	Per cent. by weight.	Assay % Pb.
On 20	14.4	3.0	3.1	5.5
On 40	32.1	2.4	38.5	4.4
On 60	13.0	2.5	16.4	4.5
On 80	23.6	2.8	25.7	4.9
On 100	2.2	3.2	1.9	5.5
Through 100	14.7	9.6	14.4	11.4
Totals	100.0	3.7	100.0	5.6

The latter trials tend to show that by the better classification the assay value of the tailings from the coarse jigs was lowered by 1.1 per cent. lead, and that of the tailings from the fine jigs by 2 per cent. lead. It is also noticeable that in the last example not only was the proportion of the material passing through the 100 mesh lessened but also the assay value of that which passed through was lowered.

The fine material which is removed in classification finds it way into spitzkasten, where it is mixed with other slimes, settled, thickened, and fed on to vanners. A rough example of vanner feed and vanner tails, which, in the Block 10 mill, include coarse overflow material from trucking floors, is as follows:

Mesh.	Feed.		Tails.	
	Per cent. by weight.	Assay % Pb.	Per cent. by weight.	Assay % Pb.
On 20	....	....	0.5	4.1
On 40	1.4	6.2	3.3	4.6
On 60	1.6	6.2	2.7	4.6
On 80	6.4	5.8	11.9	3.8
On 100	1.4	4.8	2.0	3.7
Through 100	89.2	15.0	79.6	6.5
Totals	100.0	14.0	100.0	6.0

There is, of course, room for improvement in the example of vanner dressing here shown. Better work could be done by further classification and the use of a larger number of tables; but a point in all milling is reached which, from a commercial standpoint, it is not advisable to pass. This point is arrived at when the cost of further extraction approaches the profit accruing from a higher recovery of metallic contents. This will vary in every different mill. It is affected by local circumstances in all cases, and is a matter for the careful consideration of the mill superintendent as to how far it is profitable to carry his extraction. It is possible that, in a mill claiming to do very high-grade work, the last 2 or 3 per cent. in recovery is obtained at a financial loss to the company.

The Pittsburg or No. 8 Seam in Ohio.

BY J. L. PULTZ.*

The Pittsburg, or No. 8 seam, as it is known in Ohio, is the most important coal-bed in the State. It occurs at the base of the upper coal measures in the southeastern portion of the State. The territory in which this seam occurs has been divided by the Geological Survey into two distinct fields: First, the eastern Ohio field, and second, the southern Ohio field. The former includes southern Jefferson county, eastern Harrison, Belmont, probably the northeastern corner of Monroe. Its approximate western boundary is designated by a line drawn from the southwest angle of Belmont county to New Martinsville, West Virginia. It is said to be of less value west of this line. The latter division lies south and west of the first field; it takes in Mingo county, the eastern half of Athens, a small portion of Morgan county along its southern border, and probably the southeastern corner of Washington county. The reason for dividing the total area of No. 8 seam in Ohio, is the fact that there is a decided break in the continuity of the seam between these two fields; this break is shown in a gradual reduction of the seam, the roof coal disappearing first, and the Pittsburg sandstone being let down directly on the coal. The center of the break is said to be at Duck creek valley, in Noble county. At this point the Pittsburg seam is simply represented by a fine clay and a block marble, indicating the position of the bed. This barren area probably occupies Muskingum, Guernsey, Morgan, Noble and the southeast and southwest halves of Washington and Monroe counties.

The Pittsburg seam enters the eastern Ohio field from Hancock and Brooks counties, West Virginia. Its most northerly outcrop in Ohio occurs in the high hills in Jefferson county, a few miles from Steubenville. The general dip of this seam is to the southeast.

The character of No. 8 seam in the eastern field shows it to be a coal having the face and butt cleats well developed, and strong enough to bear transportation well, although the seam is probably softer here than in Pennsylvania. In thickness

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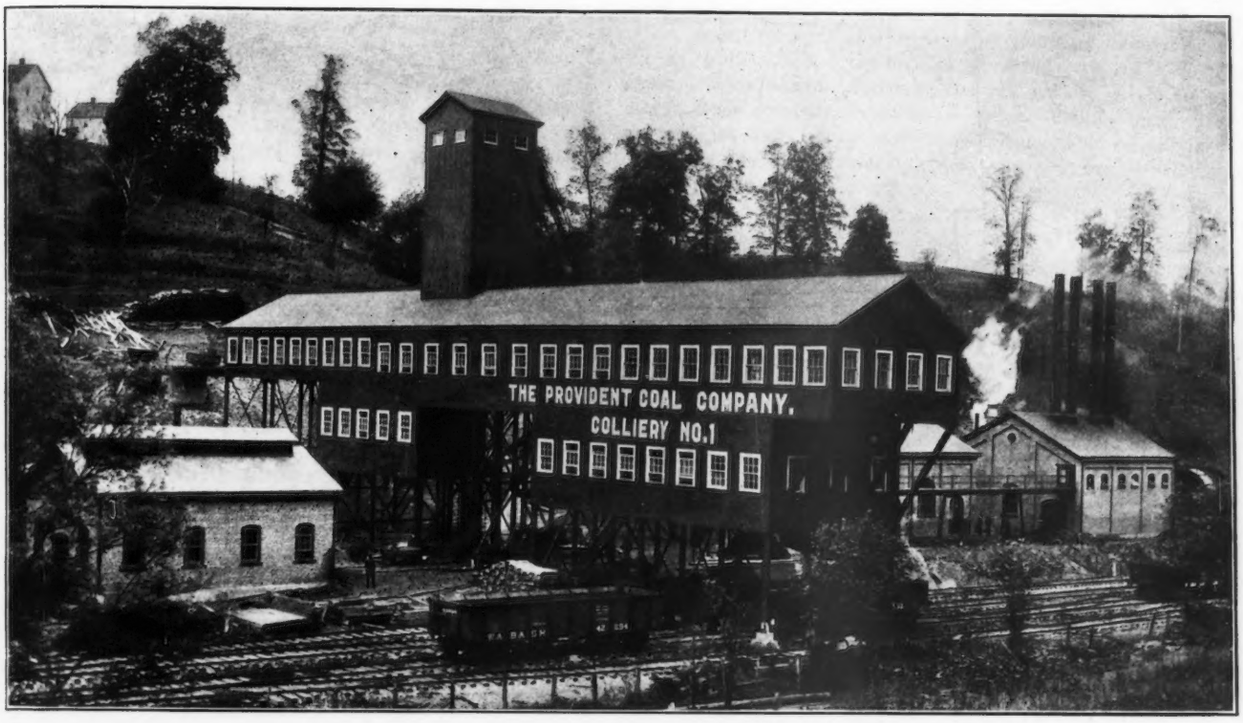
this coal varies from 4½ to 6½ ft. As in Pennsylvania, it consists of a roof coal mixed with shale from 1 to 4 ft., separated from the main seam by 1 ft. of fire-clay known as "draw slate."

Bridgeport. The elevation of the seam at this point gives it a large acreage and makes this region preferable to Jefferson and Harrison counties to the north, where the coal appears high on the hills and has

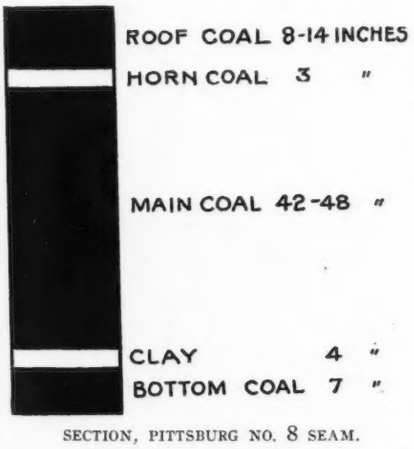
of pyrite occurs in lumps and stringers. In some localities, however, the coal is almost entirely free from it. The analysis given below is characteristic of the No. 8 seam in this State:



TYPICAL ARRANGEMENT OF AN OHIO COLLIERY PLANT.

The No. 8 seam is considered an excellent steam coal and domestic fuel. Its slack possesses coking properties in a high degree, but often the high sulphur content prohibits its use as a metallurgical fuel, without a preliminary treatment to eliminate its objectionable constituents.

There is probably a large tonnage of No. 8 seam under cover in southwest-



SECTION, PITTSBURG NO. 8 SEAM.

ern Belmont and the northeastern half of Monroe county. This supposition is borne out by oil-well records. The best development of No. 8 seam is probably in the region around St. Clairsville and Wheeling creek in Belmont county, where the bed is only about 70 ft. above the Ohio at a thin cover which is often the cause of water getting into the workings.

The seam goes under water on the Baltimore & Ohio Railroad not many miles to the westward of Glencoe in Belmont county, and also on the Wheeling & Lake Erie Railroad. This is due to the high ridge and water-shed running in a general north and south direction through the towns of Flushing and Morristown, in Belmont county. South and east the coal goes under water at Bellaire, on the Ohio.

The center of development of No. 8 seam in the southern Ohio field is in Mingo county where it has been mined for nearly a century. It is found in several townships in Athens county and in a few unimportant outliers in Morgan county.

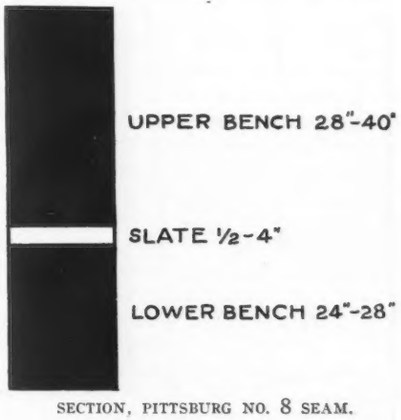
The greatest thickness of No. 8 seam in the State is said to occur in Athens county where 8 ft. of clean coal occurs in two equal benches separated by one or two feet of fire clay or sandy shale. This coal has been worked on the extension of the Toledo, Ohio and Central Railway.

No. 8 seam has two characteristic partings, a black slate about one foot from the bottom and two thin bands of fire clay at the center. The floor is a fine clay, below which comes the limestone. The roof varies greatly, but is generally a draw slate about 10 in. thick with a thin seam of coal above it. Above this is a massive limestone. Sulphur in the form

ANALYSIS OF NO. 8 SEAM.

	V. M.	F. C.	Ash.	S.
Jefferson Co.	40.06	50.09	7.02	3.31
Harrison Co.	40.42	49.42	7.25	3.66
Belmont Co.	41.75	48.27	8.08	4.24
Meigs Co.	38.60	50.05	6.51	1.42
Athens Co.	40.39	47.60	7.14	4.22

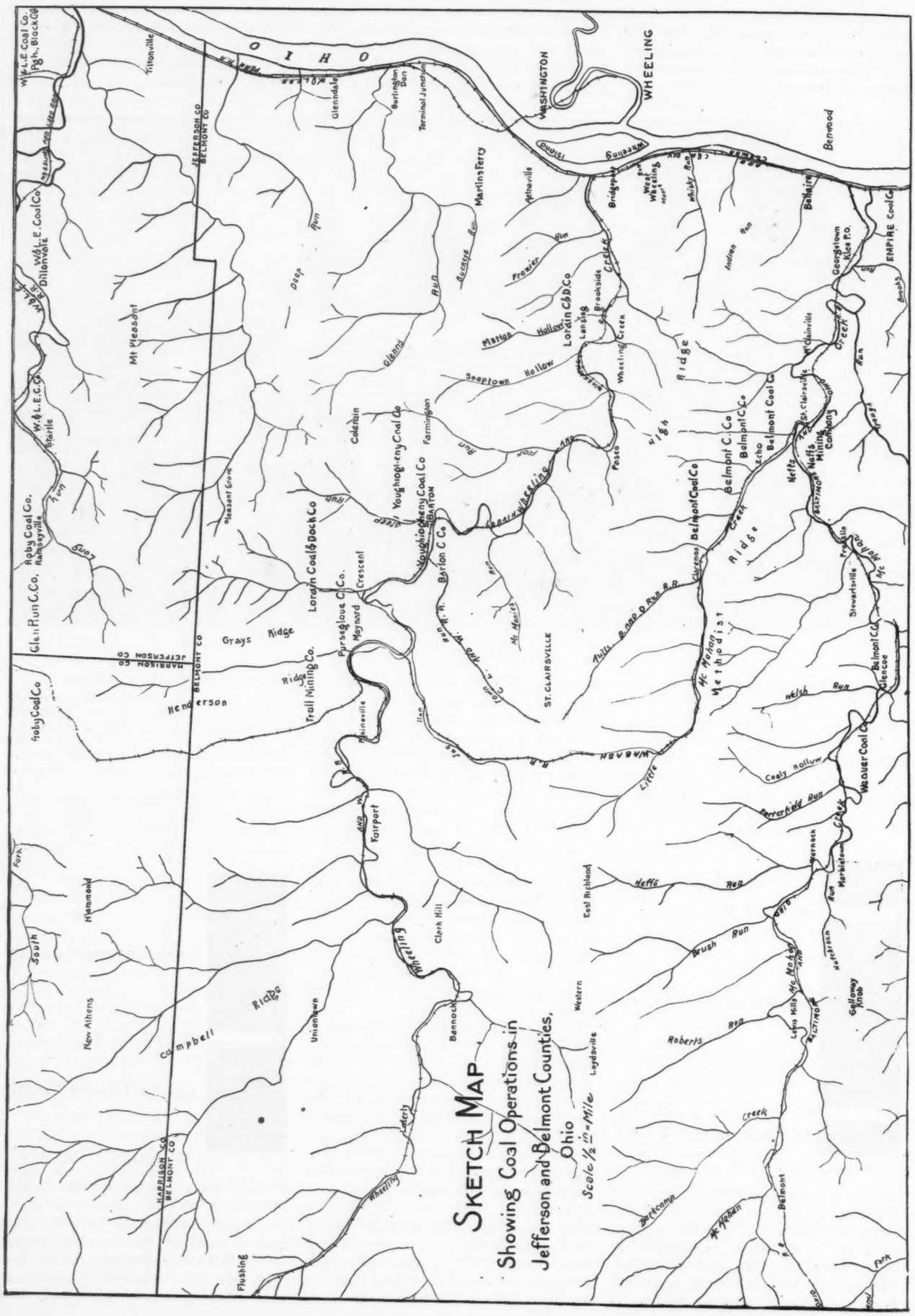
The following is a brief general description of the method of mining No. 8 seam in Ohio. In numerous mines local conditions necessitate methods being em-



SECTION, PITTSBURG NO. 8 SEAM.

ployed which are at considerable variance from the method here discussed.

The coal is attacked by the double-entry system; sometimes the main headings are on the butts and sometimes on the face. This does not make much difference as both cleats in the coal are equally well


SKETCH MAP
Showing Coal Operations in
Jefferson and Belmont Counties,
Ohio
Scale 1/2 in. = Mile
OHIO
WHEELING
WASHINGTON
JEFFERSON CO
BELMONT CO
HARRISON CO
Wheeling
Ohio River
Wheeling Island
Bridgeport
Martinsferry
Bellaire
Benwood
Glendale
Terminal Junction
Tiltonville
Dillonvale
Mt Pleasant
Ramsyville
Pleasant Grove
Colerain
Farmington
Barton
Flushing
Hammond
New Athens
Campbell
South
Ridge
Union Town
Bannock
Clark Hill
Fairport
Mineville
Henderson
Grays Ridge
Trail Mining Co.
Pursglove C. Co.
Maynard
Crescent
Loraln Coal & Dock Co
Youghiogheny Coal Co
Youghiogheny & Ohio Coal Co
Belmont C. Co
Belmont Coal Co
Echo
Neffs
Neffs Mining Company
St. Clairsville
Mt Hesper
Flats
Clarence
Franklin
Stewartsville
Belmont C. Co
Silence
Welsh Run
Coaly Hollow
Weaver Coal Co
Porterfield Run
Warnock
Marbletown
Neffs Run
Brush Run
Roberts Run
Lewis Hills
Galloway Knob
Loydsville
Western
East Richland
Wheeling Creek
Belmont
Mt Nebo
Barkcamp
Park
Loraln C&D Co
Lansing
Brookside
Frazier Run
Seaptown Hollow
Glenns Run
Deep Run
Acreage Run
Whisky Run
Indian Run
Georgetown
Klea P.O.
EMPIRE Coal Co
Brooks
Mt Clairville
Creek
Ridge
High
Wheeling Creek
Pike Run
Short Creek
Little Wheeling Creek
Wabash R.R.
Pitts. & Lake Erie R.R.
Pitts. & Ohio R.R.
Pitts. & Pan Run R.R.
Mc Mahan
Methodist
Wilson
Ridge
Ridge
Ridge

defined. Main headings are driven with 50-ft. pillars and spaced from 1200 to 1500 ft. apart. A distance of 450 ft. is left between cross-headings, making 225-ft. rooms. Rooms are turned with 21-ft. necks, 8 ft. wide, and range in width from 24 to 30 ft. depending on the roof, which, as already stated, varies greatly in different portions of the field. It is customary to leave an 8-ft. pillar between the rooms, and this pillar is never captured. The track is run up the center of the room. Jeffrey machines are used almost entirely. They undercut about 5½ ft. Three shots are generally fired; two along the rib and one in the center. Black powder only is used, and when the coal is mined by pick, the bearing-in is made in the parting of the center of the seam, it being customary to penetrate the coal for a distance of 3½ ft. Jeffrey 15-ton six-wheel locomotives are employed in the main haulage roads of many of the operations, where 35-lb. rail is generally used. In the rooms, 3x3-in. wooden rails are used. The capacity of the pit wagons varies from 1½ to 2½ tons.

The following are brief descriptions of some of the principal mines in Belmont, Harrison and Jefferson counties:

The Lorain Coal and Dock Company is located at the town of Wheeling creek, which is situated about three miles from Bridgeport. The company has a very large acreage of coal land both at the locality already mentioned and also at Flushing, which is situated some distance farther up Wheeling creek. No. 8 seam is alone worked. It occurs at an elevation of about 72 ft. above the Ohio river. At Lansing, 1½ miles above Wheeling creek, the seam is 6 ft. in thickness, but its average thickness in this locality is about 5½ ft.

The operation consists of five mines located at Wheeling Creek, Lansing and Crescent. The Wheeling Creek No. 2 mine was first opened 28 years ago. It was abandoned 10 years and opened up again later. The five mines at Crescent were first opened in 1901. They are tributary to two tipples, No. 2 and 3 to one, and 4, 5 and 6 to the other tipple. The Lansing mine has been opened about three years.

Wheeling Creek No. 1 mine is situated on the south side of Wheeling creek a short distance from the town of the same name. This is the largest mine of the Lorain Coal and Dock Company. The coal is attacked by two face headings connected with the tipple by an outside haul crossing a small tributary of Wheeling creek on a trestle and running along the side of a ridge for a distance of about 2000 ft. The other mines operated by this company are comparatively young and the equipment is new and of the latest style.

The Youghiogheny Coal Company is located at Barton in Belmont county. In this vicinity, the coal lies somewhat higher in the hills than at Wheeling creek. The seam is about 5½ ft. in thickness. The company operates two mines, the Barton Hill mine and the Maple Hill mine, a short distance up the railroad from the station.

The Barton Hill mine has been operated for some time. The main haulage road is equipped with an endless rope haulage operated by a 30-h.p. motor located at the tipple. The power plant consists of two McEwen engines of 325 and 300 h.p., direct connected to two Thompson Ryan dynamos of 200 kw. each. The voltage is 500. There are two Erie and two Atlas boilers of 150 h.p. each, and two more of the same power have lately been installed. This power equipment takes care of the two mines. The load is 3 six-ton Jeffrey room-locomotives, one 12-ton motor, and about 18 machines of the Jeffrey type.

A steel tipple has lately been constructed at the Maple Hill mine and it is equipped with pockets and larries for coaling locomotives on the main line.

The Wheeling & Lake Erie Coal Company has mines at Connor, Dillonvale and Long River. The company owns four mines on the Wheeling & Lake Erie Railroad within a few miles of each other. The mines are Connor No. 1 and No. 2, Dillon No. 2, and Long River. Dillon No. 2 is located on the southeast bank of Long River creek in the ridge above the town of Dillonvale. The coal at this locality has been worked for many years. From the pit mouth the coal is sent down a gravity plane to the tipple in the valley below. The coal in this section is held much higher in the hills than to the south above Wheeling creek.

The power plant equipment consists of six 150-h.p. boilers, four of which are the Jeffrey type, two 160-h.p. McEwen engines, one 160-h.p. Skinner engine, one Morgan-Gardner generator of 150 kw. and two 150-kw. Jeffrey generators. Ventilation is accomplished by a Brazil fan driven by steam. A 90-h.p. electric six-wheeled locomotive is used in the main haulage roads. The locomotive is of the Jeffrey type and has three motors. One 16-ton Jeffrey locomotive does the necessary switching at the pit mouth. Besides these, two 6-ton Jeffrey locomotives are also used in the mine. The mining machines are 6-ft. undercutters of the Jeffrey and Goodman types. After the coal passes over 1½-in. screen bars, it passes into a trommel or revolving screen with circular holes through which the nut coal passes.

The eastern boundary of this area comprising this No. 8 seam in Ohio follows in a general way the course of the Ohio river. The field in this State containing the No. 8 seam, is somewhat over a hundred miles in a northeast and southwest direction along its main axis; the widest part is about 40 miles on a line drawn between Zanesville, Ohio, and Tyler, W. Va. This field is intersected by five main railroads, the ones having the heaviest tonnage being the Cleveland, Loraine, & Wheeling, the Baltimore & Ohio, and the Wheeling & Lake Erie.

There is a larger acreage of No. 8 seam underlaid in Belmont county than in Harrison and Jefferson counties, where the bed lies much higher in the hills. The Pittsburg coal-bed is only developed to a very small extent within these three counties, and the favorable conditions for working warrant much new development work.

The greater bulk of the Pittsburg coal in Ohio lies south of the comparatively small area just discussed. The coal in this southern portion has not, as yet, been attacked to any great extent; this is due probably to the fact that much of the No. 8 seam lies buried at considerable depth. There are also good shaft propositions in western Belmont and Jefferson counties, where it is said the Pittsburg seam can be reached at a depth not exceeding 100 ft. at many points.

A New Electric Dump Car.

A new style of electric dump car, covering a wide range of usefulness and adapted to meet a number of different requirements, has lately been designed by the Jeffrey Manufacturing Company, of Columbus, Ohio, and is shown in the accompanying illustrations.

The car consists of a structural steel truck or frame, upon which is mounted a steel hopper. The truck is provided with such electrical equipment as the required duty demands. The equipment consists of two Jeffrey M. H. 64, 250-volt motors, one motor being geared through a single reduction to each axle, the gears being inclosed in dust-proof cases and running in oil. The journal boxes are removable without dropping the wheels, and are provided with renewable steel wearing faces. The boxes are held in cast-steel pedestals which are securely bolted to the steel channel frame, and which are also braced at the lower end with diagonal braces.

Four sand boxes of liberal capacity are provided. The brake is of the self-locking type. The hopper is built of heavy sheet steel suitably braced and reinforced; when loaded, as shown in the accompanying illustration, the car has a capacity of 25,000 lb. of run-of-mine coal. This hopper is so supported on the frame that the weight is uniformly distributed throughout the structure.

Probably the most novel feature of this car is the ease and rapidity with which the load may be discharged. To facilitate this, the bottom of the car slopes from a hip or ridge in the center down to the bottom edge of each side door, and at the front end is a triangular face or slope descending from the ridge to the bottom edge of the front door. The angle of slope of the bottom is made whatever may be neces-

sary to discharge readily the material to be hauled. The doors are securely hinged to the body of the hopper and are so hung that they open slightly by their own weight whenever the holding chains are loosened. This feature, together with the sloping bottoms, results in a free and rapid discharge of the load.

Each door is provided with three chains for holding it closed. The two side doors are operated simultaneously, the front door being operated independently. The chains are wound upon windlass shafts and each chain is provided with length adjustment, so that the strain may be equally distributed on all of the chains.

FIG. 1.

FIG. 2.

The method of operating these doors may be arranged to suit the purpose for which the car is to be used. For instance, each door may be operated separately, any two may be operated together, or all doors may be arranged to operate simultaneously.

The mechanism for operating the doors is self-locking in any position and is easily and quickly manipulated. Fig. 1 shows the convenient arrangement of the operating mechanism. The vertical shafts and hand wheels at the right and left operate the front and sides doors respectively, and the hand wheel and shaft in the center operate the brake. At the left of the operator's seat is seen the controller, and at the right, supported between the brake and the front-door control shafts, are seen the sand-valve handles.

Each car is provided with two headlights and a gong is located under the floor plate within reach of the operator's foot. The car illustrated is used for handling slack and discharges its load from a trestle elevated at a considerable hight above the ground. Dumping the slack from the front and both sides will gradually form a fill or embankment upon which extensions to the track may be laid. These cars are built in several sizes and for any purpose to which they are suited.

Submarine Coal Mining in Nova Scotia.

The largest submarine operation in North America is the Princess colliery in Cape Breton island. This mine is one of the six under-sea workings in Nova Scotia, and was the first colliery in North America to extract coal from beneath the bed of the Atlantic ocean. The coal is of good quality and averages about 6 ft. in thickness. The seam dips seaward at an angle of 5 deg., and is worked almost entirely by the room-and-pillar system. The overhead cover at the shore line consists of 690 ft. of solid measures, although part of the rise workings are operated under a cover of less than 500 ft.

The present workings are distant from the shore line 5800 ft. to the dip. At this point the overhead cover is 1140 ft. in thickness of strata, with 33 to 40 ft. of water above it. The under-sea workings in the whole coal cover 1620 acres. No sea water has yet found its way into the workings as a result of removing the pillars. A feeder of a few gallons of water per minute was encountered in some whole-coal workings driven to the rise, as also at the face of the water levels driven in the direction of the outcrop to the south, but this water evidently followed the seam of coal downward from its outcrop under the waters of the harbor. There has been no water known to come from overhead across the measures.

This immunity from overhead leaks from the ocean is probably due to the presence in the superincumbent strata of 12 beds of fire-clay or underclay of a total thickness of 39 ft., as well as to the numerous beds of shale. The subsidence of the overhead strata caused by the removal of a bed of coal 6 ft. in thickness would probably under these conditions soon choke itself, so that there would be no further actual motion or settling of the strata for more than, say, 100 ft. upward. Above that point the elasticity of the beds of shale and fire-clay mentioned would prevent any rupture. Fire-clays when brought into contact with water soon forms a soft clay resembling putty and impervious to water. Out of the submarine area there has already been taken some 5,250,000 tons of coal from the main seam, while the company has also commenced the working of another and thicker seam in the same area, from which in all likelihood they will secure as much coal as has already been taken.

In determining the thickness of pipes so they will be sufficiently strong to resist bursting pressure exerted by water flowing through them, there should always be an addition of at least 100 lb. to the calculated pressure, to make allowance for water ram. In order to decrease the strain due to water ram, the valves should always be closed slowly, this necessity being more urgent as the pipes increase in diameter. Running water, when arrested suddenly, creates a great pressure throughout the entire length of the line. For this reason, stop-gates should be shut by screws, since they prevent any sudden closing.

Helen furnace, at Clarksville, Tenn., uses as fuel about 85 per cent. of coke and 15 per cent. of raw bituminous coal. It is the only blast furnace in the South using any raw coal; and the use of bituminous coal in the furnace is quite rare in this country. Three furnaces in the Hanging Rock region in Ohio also use a mixture of raw coal and coke.

Colliery Notes.

The safe load for a mine prop may be assumed as one-third of its crushing load.

Black varnish mixed with turpentine makes a good coating for iron smoke-stacks.

Broken coal (run-of-mine) occupies 75 per cent. more space than when in the solid.

In transmitting power, if a belt is used, the motion of driving should run with, and not against the laps of the belt.

A steam engine having two cylinders connected at right angles on the same shaft develops no more power than a single-cylinder engine, while it consumes one-third more steam.

Recent tests showed that one ton of soft coal used in a modern gas producer will generate as much power as 2.7 tons of the same coal when used under the steam boiler.

It is estimated that the lignite coal areas in Montana will aggregate nearly 50,000 square miles, while her bituminous area exceeds that of any Rocky Mountain State except Colorado.

In calculating the horse-power necessary to pull a trip of loaded cars up an incline, it is advised that the coefficient of rolling friction be taken as 1/40 of the weight of the load.

One of the causes of a serious loss in the transmission of compressed air, is pumping the air of the engine room rather than air drawn from a cooler place. This loss amounts to from 2 to 10 per cent.

A good cement for steam and water joints is made by mixing 1 part litharge, 3 parts black oxide of manganese and 10 parts white lead with sufficient boiled linseed oil to bring the mixture to the proper consistency.

As a general rule, the actual capacity of a pump will vary from 75 to 80 per cent. of the theoretical capacity, depending on the condition of the valves, piston, etc. The actual horse-power required by the pump is about 60 per cent. more than the theoretical.

The suction pipe of any pump should be larger than the discharge pipe. It should not exceed 300 ft. in length and should have not more than one or two elbows. Only in exceptional cases should the flow of water in the discharge pipe exceed 500 ft. per minute.

A simple method for determining the length of a belt when it is not convenient to measure around the pulleys, is to divide the sum of the diameters of the two pulleys by 2, and after multiplying this quotient by 3.3, then add twice the distance between the centers of the shafts to the product obtained.

Of all the means suggested as an aid to prospectors in search of coal, the most useful fact to remember is that the outcrop of a coal seam is accompanied at intervals by springs often carrying iron in solution. This condition is chiefly due to the hard impervious nature of the strata underlying the seam.

If a compass needle be held under a wire where an electric current is passing, the needle will tend to stand at right angles to the wire; the amount of the deflection of the needle will be in proportion to the strength of the current, and with a little practice, an observer can soon learn to estimate roughly the strength of current.

It is doubtful if any conditions exist that justify a mine superintendent in driving main or cross entries more than 8 or 9 ft. wide. No possible advantage can result from so doing, while on the contrary, the haulage roads are weakened and greater expense is incurred. Mining by machines has been the chief cause influencing the driving of wider entries.

A coal for domestic use should burn steadily and remain ignited at a low temperature, not necessarily using much draft. It should not run more than about 24 per cent. volatile matter, because of producing smoke and soot. A sulphurous coal is also bad, as it produces stifling gases when the draft is defective. For general domestic use, the coal should be non-coking and have a light ash.

A recent accident in which seven men were seriously injured calls attention to the careless handling of naked lights while charging shot-holes with gunpowder. It is wrong to consider that naked lamps in the hands of miners are only dangerous in setting off gas, for mine fires as well as other disasters are often directly traceable to the improper handling of naked lights.

When steel is too hard to cut or file easily, an application of the following mixture will quickly make a hole in it. Take 1 oz. of copper sulphate, ¼ oz. of alum, ½ teaspoonful of powdered salt, 1 gill of vinegar and 22 drops of nitric acid. By placing a rim of wax on the steel, leaving that part of the surface exposed where the hole is to be, the acid will be confined, and only act where desired.

In timbering a mine, it is always best to place the sticks in the direction of the strain that they are to resist, so that they will be subject to compression instead of a transverse strain. The sticks are weakened when mortise and tenon joints are cut, and in distributing the props it should be the object of the timberman to so place them that centers of revolution are avoided, and the pressure instead of being concentrated is evenly distributed.

When muddy water, containing salts of lime, is used in a boiler, there is no satisfactory means of preventing incrustation except filtration, which latter process, when combined with some means of precipitating the solid matter, will be found effective. It will be found that by adding ¼ lb. caustic soda per horse-power, and steaming for some hours, the operation of cleaning will be greatly facilitated, as the scale will be rendered soft and loose.

Where the timbers supplied to a mine for props are too large and it is desired to reduce the size of the individual sticks, it is always better to split them than to saw them, as this does not destroy the grain or fibers of the wood. The props should be frequently probed to see that dry rot is not destroying the heart. Slowness of growth is a favorable item to consider in selecting the sticks, and is indicated by narrow annular rings, freedom from knots, resin and sap.

When the workings of a coal seam are divided into sections or panels, and the system of mining is then carried on by first developing the narrow work in this section, and afterward driving the rooms and extracting the pillars on the retreat, the advantages accruing are many. Better ventilation is secured, more coal is obtained, squeezes avoided, props, ties and rails are recovered for use again. The coal has not weathered so much, the absence of falls prevents clogging of the ditches and consequently prevents mine water from eating the rails.

For several years practically all the coal production of North Carolina has been from one mine, the Cumnock, near Egypt, in Chatham county. The output has been very irregular and during the last three years has notably declined. The largest production in recent years was in 1899, when 26,896 short tons were mined. There are two areas in North Carolina where coal occurs. Both of these are found in the Triassic formation and are of the same age as the Richmond coal basin, in Virginia. The two areas are known as the Deep and Dan river fields, being named from the two rivers that drain them. The only productive beds at present are those in the Deep river district, in Chatham and Moore counties.

Where compressed air is used, it is important that all joints in the air mains should be carefully made to prevent any possible leaks, as air leaks are more expensive than steam leaks. At intervals, it is well to test for leaks by allowing the air at full pressure to remain in the pipe long enough to observe the gage. To render pipes accessible for inspection, they should, if buried, be carried in boxes sunk just below the surface of the ground, and all low points which might form pockets for the accumulation of entrained water should be avoided, as they obstruct the passage of the air. It is also advisable, in long, uneven lines, to provide an opening near the end, for occasionally blowing out water. Long lengths of pipes on the surface or shafts where the temperature is subject to changes, should be provided with expansion joints.

Metallics.

Magnesium in sticks or masses will not burn in air; in order to ignite the metal it must be finely pulverized.

Silicon is used in copper alloys as a deoxidizer; one part silicon copper will deoxidize 100 parts of casting copper.

A large excess of magnesium over that necessary to deoxidize, will render a copper casting dirty. The usual amount added is about 2 oz. to 100 lb. of metal.

An alloy of 78 per cent. gold and 22 per cent. aluminum has a purple color and is known as "purple gold." On account of its brittleness it has no value for jewelry.

Tallapoosa furnace, at Tallapoosa, Ga., is running on a mixture of charcoal and coke as fuel. It is the only furnace in the United States using this mixed fuel at present.

Lightness and affinity for oxygen render magnesium valuable. It has a greater affinity for oxygen than any other metal, and is, therefore, useful as a deoxidizer for metals.

The uses for chromium-tungsten steels is confined to high-speed cutting tools. Steel of this class should contain more carbon than when alloyed with nickel, manganese, silicon, etc.

When zinc exceeds the copper the alloy rapidly whitens in color and becomes brittle and worthless at 65 per cent. zinc, 34 per cent. copper and 1 per cent. aluminum.

Investigations into the nickel-aluminum series for steel, while very incomplete at present, nevertheless show that additions of aluminum to nickel steels tend to increase the tensile strength and elastic limit.

When introducing tungsten, chromium, vanadium, etc., into steel, an alloy of these elements with iron is used, rather than the pure metal, because of the lower melting point of the ferro-alloy and also because of the lower cost.

Experiments have shown conclusively that when coal placed in iron crates is stored under sea water, the calorific value of the fuel is maintained, while coal stored in the open air for an equal length of time shows a decided decrease.

Heretofore, the only use of cobalt has been in the coloring of glass and pottery and the metal itself has not been used at all. Now it is discovered that it is useful in the manufacture of storage batteries, and deposits of it are being eagerly sought.

A metallic surface that is to be painted should be as clean and free from scale as possible. New iron from a mill is generally painted too soon, as the mill scale is very tenacious for a long time, but will ultimately come off and bring the paint with it.

When a large heap of stored coal becomes ignited, a layer of coal all around the fire becomes coked, and pouring water on the pile will not extinguish the fire. If a sharp-pointed piece of perforated pipe is driven into the burning mass, and water then turned on, the fire is soon extinguished, as the water then reaches the seat of the difficulty.

It is an actual fact that some mines are limiting their output, solely because they have equipped a poorly ballasted main haulway with light steel. It is as impossible to get good results when this is done, as it would be to expect a main-line surface railway to carry heavy traffic and maintain a high-speed schedule over a bad piece of road.

The benzoline flame in a safety lamp is superior to any oil flame because the wick does not char, the caps are larger and much more distinct, while at the same time the caps, given by percentages down to 1, can be readily seen. One of the chief advantages of using a lamp burning benzoline is that it is only necessary to carry the one lamp which acts both for lighting and testing.

It should be remembered that the room-and-pillar system of working coal, becomes impracticable, from a standpoint of economy, when the thickness of the pillars necessary to support the roof is more than twice the width of the breast openings. When such a condition exists, it is always best to work the seam by a method of retreating. This system has the further advantage of allowing the seam to be proved before too much preliminary expense is incurred.

Where compressed air is used, the initial energy may be restored by adding a slight amount of heat to the air at the point of application; in fact, the employment of a re-heater increases the volume to such an extent that additional energy is gotten when air is used expansively at a rate of 1 h.p. per lb. of coal. In mine operations the re-heater is never pushed to its limit, so that it will not interfere with the comfort and health of the men. Compressed air is only raised in temperature slightly to make up for the transmission drop in pressure.

Over 100 gold dredges have been constructed and put to work in this State of Victoria at an average cost of about £2000 ($10,000) each, and over £300,000 has been invested in the industry. Recent experiments conducted by P. G. W. Bayley, at the Mines Department laboratory, on tailings from dredges show that the methods of extraction adopted for this class of mining in the State are very complete and efficient. The investigation was undertaken with the object of determining the amount of gold left in the tailings when discarded by the dredge. Samples were taken from a great number of plants at work in the State, and results have definitely proved that the amount of gold lost is so minute as not to be deserving of consideration.

Exports of minerals from Spain for the half-year ending June 30 are reported by the *Revista Minera* as below, in metric tons:

	1905.	1906.	Changes.
Iron ore	3,859,061	5,006,155	I. 1,147,094
Copper ore	506,405	572,420	I. 66,015
Zinc ore	65,756	78,109	I. 12,353
Lead ore	3,294	2,253	D. 1,041
Manganese ore	21,674	54,447	I. 32,773
Pyrites	344,472	534,943	I. 190,471
Salt	230 045	273,898	I. 43,853

Exports of metals for the half-year are reported as follows, also in metric tons:

	1905.	1906.	Changes.
Copper precipitate	8,322	11,933	I. 3,611
Copper, metal	4,073	5,298	I. 1,225
Zinc	680	698	I. 8
Lead	84,417	86,342	I. 1,925

Increases are shown in all items. Exports of pig iron were 17,784 tons, a decrease of 15,425 tons; of finished iron and steel, 11,176 tons, an increase of 8847 tons.

There are two methods, broadly speaking, of making safety, or so-called "flameless," explosives. One depends upon the incorporation with a nitro-glycerine explosive of certain salts containing water of crystallization such as alum, which serves to drown the flame produced by the other explosive ingredients. This method, unfortunately, requires a considerable proportion of the strength of the explosive to convert this water into gas. The other class of "flameless" powders depends upon the fact that several ingredients produce a comparatively low temperature on detonation. Since the products of their complete decomposition are, in theory at least, entirely gaseous, there can be no masses of solid matter raised to incandescence from the explosive itself, thus retaining the heat of the explosion long enough to ignite the gas mixture.

A large gold dredge for service on the Forty Mile river in the Yukon was built this summer at White Horse and floated down the Yukon river to its destination. The timbers and machinery for this dredge were dispatched north from Vancouver, and the work of assembling it at White Horse commenced early in the season, so that the completed dredge was started down the river as soon as possible after the ice went out. The mechanical equipment was ordered by the Forty Mile Gold Dredging Company, of Toronto, Ont., through the Canadian representatives of the Allis-Chalmers Company, of Milwaukee. The dredge equipment, which was furnished complete, is special in nature and adapted to particularly heavy service. The dredge proper will be equipped with 5 1/3-cu.ft. buckets. The accessory machinery, ready for operation, was shipped from the various works of the Allis-Chalmers Company. It consists of engines, pumps, boilers, concentrating machinery and a small electric light plant.

THE ENGINEERING AND MINING JOURNAL

Contents.

	PAGE
Editorials:	
Lead Smelting in Germany	357
Prices of Mining Stocks	357
The De Beers Company and the Income Tax	358
Zinc Smelting in Oklahoma	358
Present Position of Lead Smelting in Germany	337
*Goldfield, Nevada.....*Claude T. Rice*	339
Treatment of Lead-Silver Tailings by the Cyanide Process...*Ernest J. Sweetland*	342
*The De Bavay Process	344
Mining in China.....*J. H. Curle*	346
*Reopening Filled Ground. *Robert B. Brinsmade*	347
*Recovery of Water in Milling. *Ernest J. Sweetland*	348
The Humboldt Smelter, Arizona	349
Concentration of Silver-Lead Ores. *V. F. Stanley Low*	349
*The Pittsburg or No. 8 Seam in Ohio. *J. L. Pultz*	350
*A New Electric Dump Car	353
Submarine Coal Mining in Nova Scotia	354
Colliery Notes	355
Metallics	356
The Wisconsin Zinc Fields—II. *Staff Correspondence*	359
Mineral Production of Sweden	359
Correspondence and Discussion:	
Quick Manganese Determination. *James Darroch*	359
Ore Milling in Wisconsin. *Trego & Brooks*	359
Austrian Mineral Production	360
New Publications	360
Notes from Magdalena Bay, Mexico. *Clement Biddle*	361
The Sampling of Ores Containing Metallics.....*Clarence C. Sample*	362
New Blast Furnaces	363
A Negative Experience with Sodium Cyanide.....*William Magenan*	363
Abstracts of Official Reports:	
Colorado Fuel and Iron Company	363
Patents	364
Personal	365
Obituary	366
Societies and Technical Schools	366
Industrial	366
Trade Catalogs	366
Construction News	366
Special Correspondence:	
San Francisco	367
Bisbee, Arizona	368
Salt Lake City	368
Denver	368
Duluth, Minn	368
Platteville, Wis	369
Calumet, Mich	369
Sudbury, Ont	370
Victoria, B. C	370
Johannesburg, Transvaal	370
General Mining News	371
Foreign Mining News	376
Markets	377

*Illustrated.

Lead Smelting in Germany.

The interesting article by Mr. Havard, which is published elsewhere in this issue, is particularly valuable in coming from a metallurgist who has had recent practical experience both in America and Germany, an advantage which few have enjoyed. Some of its data are especially suggestive at this time, when the high price for lead in the United States, the recent importation of small quantities of foreign lead, and other conditions are leading consumers to discuss the effect of the Dingley tariff on the American price for this metal. Mr. Havard throws much light upon some of the points involved in this question, entirely however as part of his discussion of the conditions in Germany without reference to those of America.

Mr. Havard points out an essential difference between American and German practice in calling attention to the fact that the Germans smelt a charge richer in lead than the Americans, who treat a larger portion of silicious ore along with the lead ore and regard the latter chiefly as a collector for the precious metals. It should be explained that in making this statement, Mr. Havard has in view especially the silver-lead smelters of west of the Rocky Mountains, who do indeed run substantially on the basis which he indicates. However, we have in the United States an important group of smelters in the vicinity of St. Louis, Mo., who work up the high-grade, non-argentiferous concentrate of Missouri and treat a charge fully as rich in lead, if not richer, than the German smelters. Their practice differs from the German in not including the treatment of argentiferous ores, but this is due only to the fact that such ores are not available to the Missouri smelters on profitable terms, owing to geographical and competitive limitations. We are disposed to consider, therefore, that the German practice should be compared with the Missouri practice rather than with that of the Rocky Mountains. On this basis, we think that it would appear that the American smelters, at least those which have modern plants, are in no way inferior to the German in the point of metal extraction, but on the other hand it would probably figure out that the American cost of smelting is considerably more per ton of ore than the German cost.

It is interesting to note that the cost of smelting in the German plants is about the same as in the American silver-lead plants, in spite of the cheaper labor, which averages less than one-third the cost in the United States in point of wages, but is much less efficient, wherefore the difference in net cost is not so great as would appear from comparison of the wages scales. However, it is misleading to make comparisons between the German plants, treating a comparatively small tonnage of high-grade ore, and the American plants, which treat a very large tonnage of low-grade ores, for the reason which Mr. Havard himself points out, namely, that in the American plants the function of the lead in the ore is chiefly to serve as a collector for the precious metals. Although the American smelters receive much high-grade lead concentrate, it is mixed with other ores, so that the average product for smelting does not ever contain much more than 12 per cent. lead, and sometimes is lower.

The divergencies in the practice of silver-lead smelting west of the Rocky Mountains, and the smelting of high-grade, non-argentiferous ores in the vicinity of St. Louis are so great as to constitute them decidedly different branches of the art of lead smelting. The silver-lead smelters regard their lead product chiefly as an indispensable collector of the precious metals, which must be obtained at any cost, and sometimes in competition with the copper smelters, who have decided advantages on certain classes of ore. In other respects also, they are obliged to concentrate their attention upon the profitable treatment of non-plumbiferous ores. Regarded from the standpoint of lead smelting, the mixture to be treated is a very low grade of ore. In considering the cost of the production of lead, these conditions should be given careful attention.

Prices of Mining Stocks.

Notwithstanding the high prices for copper and the large earnings of the producing companies, there is comparatively little activity in the market, Boston especially being dull, and surprise is expressed that shares in many of the best companies are selling far below previous levels, at prices on which they now yield 8 to 10 per cent., and nevertheless fail to attract much interest. However, the attitude of investors which produces this situation is in no way difficult to understand. There is a general feeling that, although the price

for the metal is likely to continue high for a long time, there is not much prospect that it will go materially higher; and there is a decidedly better understanding of the merits of mining investments, which produces the conviction that mining stocks, even those of good companies, are not too low when they yield 8 to 10 per cent. on their cost price. This is a correct view.

First-class railway stocks, like Pennsylvania, have recently sold at prices yielding 5 per cent. on the investment. First-class industrials, like U. S. Steel and National Lead, are now yielding nearly 7 per cent. on their preferred stocks, with unbroken dividend records. A well-managed railway or industrial stock continues to have an earning capacity indefinitely, but the mining company, even those which have developed ore reserves of such magnitude and metallurgical plants of such character as to put them distinctly into the industrial class, diminishes its capacity for paying dividends with every one that is paid, and arriving sooner or later at the time when the mine is exhausted, must be able to show a redemption of the principal, besides a fair interest on it, in order to have proved a profitable investment. Consequently, such an enterprise should yield a higher rate of interest than another kind of industrial.

This principle is often lost sight of in the idea that good dividends may be collected for a period of years and the capital recouped by sale of the stock, but the fallacy of this is disclosed by the large losses which are suffered by the last holders, who cannot sell out, and the ordinary investor who is smart enough to get in and out at a profit is likely to be eventually caught himself. The only safe method of investment in mining stocks is to buy them on their intrinsic merits and consider them as a form of security which ought to yield a comparatively high rate of interest. Even then there remain the elements of speculation, such as the discovery of new and unexpected orebodies, or on the other hand the sudden failure of the mine; or the legitimate rises and falls in the metal market; and other contingencies which lend attractiveness to mining investments. It appears that this is now better understood by the public, and that the day when a mining property could be bought by promoters on a 25 per cent. basis and distributed through the stock exchanges among investors on a 5 or 6 per cent. basis has departed for good. If this be so, it will certainly be to the general welfare of the mining industry. It is an encouraging feature that during the recent period of high prices for all metals, and consequently large earnings by mining companies, there has been only a moderate speculation in the stocks, and the new enterprises which have been brought out have been considered more carefully on their merits. The fact that the prices of stocks do not rise further is indicative of a sound situation, although the purchasers at the much higher prices of a few years ago may feel disappointed.

The De Beers Company and the Income Tax.

Our London correspondent has referred from time to time to the litigation between the British Income Tax Commissioners and the DeBeers Consolidated Mines, Ltd., as to whether the company should not pay income tax on the whole of its profits. This litigation has now come to an end by the House of Lords' deciding in favor of the Commissioners and so upholding the court of first instance and the court of appeal. As the judgment of the individual members of all the courts has been unanimous, the matter must now be considered settled, and the decision will rank as one of the important interpretations of the law.

It will be remembered that from 1888 until eighteen months ago the DeBeers company has been free from this imposition of British income tax. The company was registered under the laws of Cape Colony, and its business was to win diamonds at the famous Kimberley mines. The ordinary person never imagined that the business of the company was really domiciled in England and was therefore amenable to English income tax laws. But so it has been decided, and the English exchequer benefits accordingly.

According to the Income tax act, "any person residing in the United Kingdom shall pay tax on gains arising from any business at home or abroad." For the purposes of the act a company is the same as a person, and the interpretation of the law depends on the construction of the word "residing." To the ordinary person, the first impression is that the DeBeers company as a mining company and from the point of view from its registration and head office, "resides" in Cape Colony, and, as we have previously mentioned, this interpretation was accepted for sixteen years. Owing presumably to the leading members of the diamond syndicate's, after Cecil Rhodes' death, being located in England, and dictating the policy from that center, as well as disposing of the output there, the official view veered round, and has been triumphantly vindicated by the courts.

This point of domestic economy may appear to be of little interest in America, but it may have important bearings on the future of British mining undertakings. The result will be that all the South African companies registered in that country or in England will have to pay income tax, and that many companies recently registered in Australia, America and in other countries where the mines are located, but nevertheless are governed from London, will be liable to this impost. We referred six months ago to several cases, such as the Zinc Corporation and Oroville Dredging, where the companies had not been registered in England in order to escape this impost, owing to so many shareholders' being American or Australian.

The English investor has to pay his tax wherever the company is located and registered, and this judgment has little or no effect on him. The point which we desire to call attention to here is that the French, German, and American investor will now have to pay British income tax on shares in all companies wherever registered and located as long as there is a suspicion that those controlling the companies are domiciled in England.

Zinc Smelting in Oklahoma.

A development of interest, following immediately upon the union of the Indian Territory and Oklahoma and their admission as a State, is the report of a project to erect a zinc smelting plant at Bartlesville, which is on the extension of the Kansas oil and gas field. The occurrence of natural gas there in large quantity has long been known, but the previous form of government was deterrent to the inauguration of manufacturing enterprises. The Iola pool, in Kansas, where zinc smelting with natural gas was begun 10 years ago, is now believed to be nearly exhausted, and new enterprises have been obliged to go further south for gas. The erection of a plant at Bartlesville will mark another step in that direction.

The Wisconsin Zinc Fields—II.

STAFF CORRESPONDENCE.

MINERAL POINT.

Considerable prospecting is being done in the vicinity of Mineral Point, but the Tripoli is the only producing mine. This is opened by two shafts about 350 ft. apart. One of these, 6x6 ft., 100 ft. deep, is used for hoisting, the other is used for ladder way, etc. The mine was originally worked for lead, but dry bone and blende were met in depth. The crevices, which pitch toward the south, were followed down until the flat of zinc ore was reached just above the oil rock. This deposit varies from 10 to 14 ft. in hight, and is composed mostly of seams of blende scattered through crushed limestone. About 10 ft. below the oil rock, and below the glass rock there is a deposit of sheet blende with some brangled ore. This was worked several years ago, when blende ore brought only $14 to $16 a ton. It was cobbed and hand-picked. Nothing is being done with this deposit at present. The deposit above the oil rock, which runs northwest, is from 60 to 100 ft. wide. It has been worked only about a year, but the south breast has been driven 400 ft. from the hoisting shaft, and the north breast has been driven about 350 ft. from the shaft.

The deposit is being mined as it extends. The ore is undercut in a breast 6 ft. high, the overlying ore being supported upon oak posts about 12 in. in diameter, with head boards. These posts are placed about 8 ft. apart.

The undercutting proceeds until the timbers begin to take weight, when the top ground is shot down by setting up on top of a pile of ore left for that purpose. Of course, the timbers have to be shot out at the same time. The ore is shoveled into small wooden cars, 18x18in. by 4ft. long, and trammed to the shaft where it is shoveled into the hoisting tubs, which hold about 1000 lb. As much of the waste is stored underground as is possible.

Four 2¼-in. Sullivan drills are used. Each machine drills in a shift about 50 ft. of holes, which average about 4 ft. in depth. This requires that the men set up their machines in two or three places a day. The working force consists of eight machine men, eight trammers and 11 shovelers. Generally there are two or three men off. One man underground tends to the bucket and the pump. The wages are for eight-hour shifts as follows: machine runners, $2; helpers, $1.75; trammers and shovelers, $1.75. Forty-per cent. powder is used. From 60 to 65 tons of ore are hoisted a day. The mine and mill run only day shift at present.

The hoist, which is friction driven, is situated in a derrick forming part of the mill building, so that the ore is dumped directly into the mill bin by the hoister man. The mill makes each day about 10 tons of concentrates, varying from 30 to 35 per cent. zinc. Some galena is also made. The mill is equipped with a Galena roaster, having 20 tons capacity in 24 hours, and a Dings magnetic separator.

Mineral Production of Sweden.

The output of minerals in Sweden for the past two years is officially reported as follows, in metric tons, unless otherwise noted:

	1904.	1905.	Changes.
Coal	320,984	322,384	I. 1,400
Copper ore	36,834	39,255	I. 2,421
Feldspar	18,021	19,224	I. 1,203
Fireclay	166,888	119,947	D. 46,941
Iron ore	4,083,945	4,364,833	I. 280 888
Manganese ore	2,297	1,992	D. 305
Pyrites	15,957	20,762	I. 4 805
Silver-lead ore	8 187	8 397	I. 210
Zinc ore	57,634	56,885	D. 749

The metallurgical products of Sweden are reported thus:

	1904.	1905.	Changes.
Pig iron	528,525	539,437	I. 10,912
Copper	533	1,385	I. 852
Copper sulphate	1,248	1,029	D. 219
Gold, kg	61	55	D. 6
Lead	589	576	D. 13
Silver, kg	651	606	D. 45
Zinc	333	305	D. 28

Iron and steel metallurgy is much the most important industry of Sweden. Statistics of the iron and steel industry are given below:

	1904.	1905.	Changes.
Pig iron	528,525	539,437	I. 10,912
Crude wrought iron	189,246	182,640	D. 6,6 6
Bessemer ingots	78,577	78,204	D. 373
Basic ingots	252.832	288,675	I. 35,843
Crucible ingots	1,162	1,319	I. 157
Iron and steel in bars, straps, etc.	252,888	284,380	I. 31,492
Wire-rods	31,863	36,009	I. 4,146
Tubes	23,594	21,809	D. 1,785
Sheets	16,331	14,700	D. 1,631

A small part of the output of iron ore requires mechanical treatment before it is smelted. During 1905 there were 24 magnetic separating plants and nine concentrators of other kinds in operation, yielding 221,744 tons of dressed ore. There were 139 furnaces in blast during the year, each one of which averaged 270 days' work and turned out 15½ tons per day. Charcoal is practically the only fuel used in the Swedish blast furnaces, a little English coke being mixed with it at some plants. The consumption of charcoal in 1905 was 43,468,603 hectoliters.

In 1905, the mines and quarries of Sweden employed 14,574 workmen, and the smelters and metallurgical works, 16,648 men. Accidents in mines and quarries numbered 591, of which 24 were fatal; and in the metallurgical works there were 518 casualties, but only six of them fatal. During 1905 there were 404 mines and quarries, 171 iron works and 15 other plants in operation. The total value of the mining and metallurgical output of Sweden is estimated at $3,326,570 for the year.

The addition of tungsten to a normal steel distinctly raises the tensile strength and to a slight degree the elastic limit.

Correspondence and Discussion.

We invite correspondence upon matters of interest to the industries of mining and metallurgy. Communications should invariably be accompanied with the name and address of the writer. Initials only will be published when so requested.

Readers are invited to use this department for the discussion of questions arising in technical practice or suggested by articles appearing in the columns of this JOURNAL.

Letters should be addressed to the Editor.

We do not hold ourselves responsible for the opinions expressed by correspondents.

Quick Manganese Determination.

Sir—A misprint occurred in the fourth paragraph of our joint article, "A Quick Method of Estimating Manganese," which was printed in your issue of July 21. The article states that "Bromide" is added to peroxidize the manganese, whereas "Bromine" is the reagent that should be used, and, to neutralize which, an excess of ammonia is subsequently added.

JAMES DARROCH.

Glasgow, Scotland, Aug. 4, 1906.

Ore Milling in Wisconsin.

Sir:—

We note in the JOURNAL of July 28, in the article on "Ore Milling in Wisconsin," several statements which lead us to offer a few personal observations relative to actual conditions as presented to the operating manager in this section.

As yet, we realize that reliable and anything like complete data are doubtless scarce to the visiting engineer, so that of necessity his conclusions must be based largely upon general appearances, or not wholly disinterested evidence. These are often misleading, and instances are frequent where satisfaction expressed regarding the surface dressing plants is but a result of gross ignorance as to the real economy of treatment.

With small exception, the ores produced in this field are highly ferruginous, and therefore necessitate a magnetic separation subsequent to the mill. It is this factor that forbids extensive comparison with the Joplin milling practice. With us, the three departments of the work, mining, milling and separating, will always be attended with considerable loss and expense, owing to the necessity of low-priced equipments. However, at present, of these three divisions a decidedly greater limitation is placed upon the mining and separating improvements, than upon the work in the jig rooms.

One striking fact in this district, and one that should claim the attention of the visitor, is that few of the properties are making money and roasting without an unusually rich mine run. There are, however, many deposits producing an average mine run of approximately 10 per cent. zinc, but requiring a magnetic separating plant. Many of these properties falter along, with frequent financial bracings, and, at least, with so small a margin of profit as to make any redemption of the initial expenditure questionable, and it is

to this class that we confine our remarks. The writers have had occasion to investigate the operation of several of the foregoing properties, and in each case discovered that the trouble most easily remedied lay in the general system of milling ore; or, to leave generalization, to produce, by a more thorough system of jigging and crushing, a higher recovery in the mill. The grade of machinery is satisfactory enough, but it is the arrangement that invites criticism.

It is obvious that the plant which is barely making a saving of 55 per cent. of the zinc content of the ore can be made, with a very little additional expenditure, to do a grade of work considerably higher than this. When one remembers that the average saving in the roasting plant will seldom be found above 75 per cent., it becomes easy to appreciate that, unless reasonably good work is being done in the preceding treatment, the total loss in the surface treatment will often reach as high as 60 per cent.

In the face of these heavy losses, the additional expense of the separating equipment, as well as the charges for roasting, are also to be considered. It might be well to mention here that the cost of separating a ton of finished product is very seldom as low as $2. Its range, however, is between $2 and $6, depending, naturally, upon the recovery and the zinc content of the mill concentrates, so that the only fair unit for separating expense is upon a basis of raw concentrates. The figure with this unit ranges from 75c. to $2.

Very often the general character of the mill feed has been overlooked, and the standard type of mill will show a marked improvement in its recovery by a preliminary concentration in the way of a picking belt installation, so that a comparatively low-grade mine-run may be delivered to the mill hopper with its tenor raised several points, materially advancing the saving in the mill treatment.

In other cases, the trouble lies in the grading of the crushing, there being an excessive amount of fines produced, which usually find their way to the sludge pond. In cases where tables are installed, of the blende which is usually returned to the jigs a very small quantity is saved, and of the remaining amount thence delivered to the roaster, a large portion is swept up the stack by the vigorous draft. This is clearly substantiated by the blende-dust covering to be seen over all the neighboring roofs surrounding the roaster stack.

It might be well to add a word here in regard to the classifier used at the Enterprise mill (referred to as the Galena type), and preliminary to the treatment on the Overstrom table for the elimination of fine lead. This classifier is simply a modification of the Richards-Coggin hydraulic classifier, designed and installed by Mr. Benjamin Hodge, a mining engineer, and it is entirely due to himself that its operation is successful.

The sheet ores, in which there is often found considerable quantities of galena, frequently offer serious hindrance to a successful separation, and in some cases their minerals are so intimately associated as to render them far from free milling. For example, at one property near Platteville, it was found necessary to crush the marcasite-blende-galena sheet to ⅛ in. before any headway could be made in the separation of the galena from the other minerals of similar specific gravity. With these Cooley type jigs, the stroke of the plungers is seldom less than ⅛ in. on the sand jig, and ranges from this figure to 1 in. upon the first cells of the rougher, the lead compartment always receiving the greatest strokes, necessitated by the heavier material to be handled on its sieves.

The future success of this field will, in no small measure, depend upon the attitude of the smelters with respect to the purchase of low-grade, ferruginous concentrates. There can be small doubt that a process requiring so much intelligence in operation, as does the calcining and separating, will never be performed with as little loss and delay as would be possible under the technical administration of any of the smelting concerns.

It is also true that the majority of the properties will always be operated with this lack of technical direction, and there will continually result excessive losses and failures in this department of the work.

TREGO & BROOKS.

Managing Engineers, Platte Zinc Mine,
Platteville, Wis., Aug. 15, 1906.

Austrian Mineral Production.

The mineral output of Austria for 1904 and 1905, is officially reported as follows. The quantities are in metric tons, unless otherwise noted:

	1904.	1905.	Changes.
Gold ore	12 653	35 937	I. 23,284
Silver ore	21,948	21,047	D. 901
Quicksilver ore	88,279	86,856	D. 1,423
Copper ore	10,701	10,677	D. 24
Iron ore	1,719,219	1,913,782	I. 194,563
Lead ore	22,514	23,339	I. 825
Zinc ore	29,226	29,983	I. 757
Tin ore	77	52	D. 25
Antimony ore	103	1,673	I. 1,570
Manganese ore	10,189	13,788	I. 3,599
Graphite	28.620	34,416	I. 5,796
Lignite	21,987,651	22,692,076	I. 704,425
Bituminous coal	11,868,245	12,585 263	I. 717,018

The products of the metallurgical plants are reported as follows:

	1904.	1905.	Changes.
Gold, kg	71	204	I. 133
Silver, kg	39.032	38,453	D. 579
Quicksilver	536	520	D. 16
Copper	889	870	D. 19
Pig iron	820,055	947,035	I. 126,980
Cast iron	168,309	172,579	I. 4,270
Lead	12,645	12,968	I. 323
Litharge	783	865	I. 82
Zinc	9,159	9,326	I. 167
Tin	38	53	I. 15
Antimony	36	90	I. 54
Salt (all kinds)	369,877	343,375	D. 26 502

The total mineral output in 1905 was valued at $46,623,106; the metallurgical at $20,641,147; and salt at $9,115,807. The mining industry employed 136,316 men, 8289 were occupied at the smelters, and 7210 men and women operated the salt works.

New Publications.

"Notes on Metallurgical Mill Construction." Edited by W. R. Ingalls. First Edition. Pp. 264; 6x9 in.; cloth. Illustrated. Price, $2. New York and London: THE ENGINEERING AND MINING JOURNAL.

"Waste of Water in New York and its Reduction by Meters and Inspection." By James H. Fuertes. Pp. 272; 6x9½ in. With tables and diagrams. New York: The Merchants' Association.

This is a valuable report on the best means of regulating and economizing water supply. It contains comparative data relating to water supply and consumption in different cities.

"The Mineral Pigments of Canada." By C. W. Willimott. Document No. 913, Geological Survey of Canada. Pp. 40; 6½x10 in.; paper. Ottawa, Canada: Government Printing Bureau.

In this report the available information with regard to deposits suitable for mineral pigments in Canada is collected and briefly summed up. Ochers, umbers, iron-ore pigments, chrome, arsenic pigments and many others are described with notes on their uses and the nature of the deposits.

"Montana Coal and Lignite Deposits." By Jesse Perry Rowe. Bulletin No. 37, University of Montana. Pp. 84. With maps and illustrations. 6x9 in.; paper. Missoula, Montana: published by the University.

This is a valuable collection of information relating to the coal deposits and the extensive lignite deposits of Montana. It is based in part on original investigations; and in part on a compilation of data which have heretofore existed only in scattered and disjointed form. It treats of the geology of the coal-bearing areas; of the form and nature of the deposits; of the actual work which has been done on them; and describes the mines which have been opened and are now in operation in the State.

"Die Werwendung von Chemikalien als Heilmittel." By Paul Cohn. Pp. 96; 6x10 in.; cloth. Stuttgart, Germany: Union Deutsche Verlagsgesellschaft. 1906.

This is a treatise on the application of chemical preparations in medicine, their nature and preparation. Dr. Cohn has gone into the subject carefully and thoroughly, on the chemical side, rather than the medicinal. That is, he treats of the composition and methods of preparation, not especially of the curative use. In other words, he writes as and for the chemist rather than the physician. After an interesting historic introduction, he treats in order inorganic preparations, metalloids und metallic compounds, and finally organic bodies. The book includes tables of analyses and the composition of various bodies.

"Preliminary Report on the Rossland

Mining District of British Columbia." By R. W. Brock. Document No. 939, Geological Survey of Canada. Pp. 40; 6½x10 in.; paper. Ottawa, Canada: Government Printing Bureau.

This is a preliminary report on the geology, economic conditions and present position of one of the more important mining districts of British Columbia. It is based upon careful and thorough field work under charge of Prof. Brock, with the assistance of the extensive mining developments of the district. It is a document of much interest; and will be followed later by a fuller report, for which Prof. Brock is now collecting additional data. The Rossland mines are among the best known in the Province; and data bearing on their probable future are of great interest.

"Weltausstellung St. Louis, 1904. Die Chemische Industrie." By Paul Cohn. Pp. 112; 9½x12 in.; paper. Vienna, Austria: Alfred Hölder. 1906.

In title and form, this is a report on the chemical industry exhibits at the Louisiana Purchase Exposition in St. Louis; but its contents are more comprehensive than this. Dr. Cohn, who is lecturer at the Technical College of Vienna, has made a study of the chemical industry of the United States, its condition and prospects. While at present this industry is not equal to that of Germany or Great Britain, he considers, in view of its rapid growth, the abundance of materials, the large supply of fuel at low cost, and other conditions, that in another decade it will surpass that of any European country. His views are based, not only on the exposition, but on extended travel through the country, and inspection of all the important chemical works.

"Minerals, and How They Occur." By Willett G. Miller. Pp. 260. Illustrated. 5x7 in.; cloth. Toronto, Ont.: The Copp Clark Company, Ltd.

Prof. Miller's very convenient book is intended, he says, for "secondary schools and prospectors." It is the outcome of his own experience in the field, and his long and intimate contact both with students and with prospectors. It gives the chief characteristics of the more commonly occurring and more useful minerals. An outline of their modes of occurrence and origin has been added. It is not intended to supersede the more elaborate works on mineralogy, but to provide a practical guide to facilitate the study of the rocks and the work of the prospector. In this Prof. Miller has succeeded well. His book will be exceedingly useful for the large classes for whom it is written; and it is very likely to lead many of them on to more elaborate study of the science. It is excellent also for the general reader, who wishes to have some working knowledge of mineralogy.

"Report on the Chibougamau Mining Region in the Province of Quebec." By A. P. Low. Document No. 923, Geological Survey of Canada. Pp. 64; 6½x10 in.; paper. With Maps. Ottawa, Canada: Government Printing Bureau.

The first exploration and discovery of minerals in the northern part of Quebec, made by J. Obalski, chief of the Bureau of Mines of the Province, were followed up by an examination of the region by A. P. Low for the Dominion Geological Survey. The region is adjacent to the Timiskaming country, of northern Ontario, and is attracting much attention, though no discovery yet made compares with the Cobalt district. Mr. Low is a most able explorer; and though his time was not sufficient for thorough work, he has given an excellent preliminary account of the district, which lies south of the Hight of Land and around lakes Chibaugamau. Obatagamau, Wakonichi and Asinitchibastat. It is a region with great possibilities, which will be opened before long by the building of the eastern section of the Grand Trunk Pacific. Some extracts from this report have already been published in the JOURNAL.

Notes from Magdalena Bay, Mexico.

BY CLEMENT BIDDLE.

There seems to be, after three weeks of observation on my part, opportunities of interest to mining men and others about this out-of-the-way spot, which, to become more or less profitable, appear to be only awaiting capital and development. All of these are mineral, except one and that is orchilla (archil, in English).

Of copper there is an abundance. The ores I have picked up about the hills and cañons are chiefly malachite, though there is azurite, too. There is from all indications plenty of it. Assays of these ores have yielded from 10 to 15 per cent. of metal with 50c in gold per ton. Prospect holes, running to 40 ft. below the surface, show that the veins extend from the grass roots to unknown depths and a well sunk some 125 ft. gave up water of a coppery taste, unfit for use. Wherever one goes, not only in the hills but also along the beach, malachite can be detected incrusted over the surface rocks. There is therefore no doubt that this district is highly mineralized with cupriferous deposits. The veins and float ore are all in close proximity to deep tidal salt water. Of wood there is none. Labor can be had for one peso per diem. Fresh water, either for culinary or drinking purposes, has to be brought to the few "shacks" forming the settlement and of course commands a certain price. The harbor is deep and ships of any draft may safely anchor on its broad waters.

Of iron ore there is likewise an abundance, a few of the hills being chiefly composed of ferruginous deposits. It can be mined under conditions similar to those of the copper ores. Some of it is highly magnetic.

Manganese is abundant, particularly on Marguerite island which lies 3 miles or so from this bay. This island, by the way, is entirely free to prospectors, and is popularly said to be highly mineralized. On a headland projecting into the sea and at the nearest point toward Marguerite there is an extensive bed of jasper, said to contain opal. It is on the main land a few miles from the Magdelena settlement.

A neighboring flat sandy islet, close to the main land, yields about 500 tons of guano per annum. No doubt more could be obtained at other points, as gulls and other marine birds are plentiful in these parts.

Orchilla, a lichen from which a valuable vegetable dye is manufactured, grows in great profusion on certain bushes about this country. The concession to pick and dispose of it is owned by a Boston syndicate, and the right to do so extends for miles up and down the coast. The process of extracting the dye-stuff is a trade secret, and belongs to the same company. The mossy lichen itself is, after some little preparation, exported in the crude state, and when manufactured the colors are used to dye seal skins. Just at present the industry has come to a halt, none of the orchilla having been picked for two years. I understand the reason for this is that the syndicate is holding out for higher prices by diminishing the supply. The picking of it is a source of support for the natives who wander about the country gathering it and for which they are paid so much per pound.

Petroleum is found a hundred miles or so distant, but so far as I know nothing in the developing line has been done with it.

In recounting these industrial factors pertaining to Magdalena bay it is evident that with energy, labor and some capital, a good deal might be accomplished, not only here but also at various points along the coast of Lower California, in the way of the acquisition of wealth as well as to make the people and country more prosperous. Nothing, however, or at best, very little, is being done along these lines.

The legislature of Pennsylvania appropriated two years ago $30,000 a year for two years toward a topographic and a geologic survey of the State in coöperation with the United States geological survey. During the present season the State survey commission has allotted $14,000 to topographic surveys, and the director of the Federal survey has allotted an equal amount of Government funds for the same work. Topographic surveys are being extended this season chiefly in Lancaster, York, Warren, Clarion, Allegheny, Beaver, Butler, Crawford, Adams, Armstrong, Westmoreland, Jefferson, Indiana, Dauphin and Mercer counties.

The Sampling of Ores Containing Metallics.

BY CLARENCE C. SAMPLE.*

The sampling of a lot of ore containing metallics is not generally a more difficult task than sampling any ordinary lot of mineral. The method given here is not new. It is generally used at sampling mills in the West, but outside of the United States, and even in certain parts of the States, I have found the sampling of ores containing coarse metallics to be looked upon as a difficult and uncertain operation.

The departure from the usual system of sampling is introduced immediately after each crushing operation and before mixing and quartering down prior to the next succeeding crushing. This departure consists in screening the material as it comes from the crusher or rolls, and screening the sample into two portions, that which will not pass the screen being composed of the coarser metallic portions, and pieces of mineral too coarse to pass the screen. By breaking up the latter and by hammering separate the mineral adhering to the metal portion, we may pass through the screen, all but the metallic portion itself.

Suppose that the system of sampling consists in passing a portion or the whole of a lot of ore through coarse crushers, thence to rolls that reduce the sample to pass a 1-in. or 1¼-in. screen. The next step will be to quarter the sample down to an amount which will fairly represent the ore to be crushed by a second set of rolls to pass a 4-mesh screen. The product of these second rolls is quartered down to suitable size to send to a coffee-mill sample grinder, after having been dried. From the coffee mills a product is obtained that will pass a 20-mesh screen, which is quartered down and reduced upon the bucking board to pass an 80- or 100-mesh screen, which operation prepares the sample to be sent to the assay office.

In the case of a sample containing metallics, the feeding to the first crusher must be carefully done. All large lumps of material should be set aside together with any pieces of metallics that might endanger the crushing machinery. These pieces are afterward broken up by a hammer, the mineral portions fed into the crusher, while the metallic lumps are freed from adhering gangue with a spalling hammer. This latter operation should be thoroughly done and the metallic lumps left as free from gangue or mineral as possible. The portion of the sample sent through the crusher then passes to the rolls, and the roll product is screened. The portion of the sample that does not pass the screen is returned to the rolls and screened again; the operation is repeated until the oversize consists of nothing but metallics bright and free from adhering gangue. The cleaned lumps of metallics set aside at the crusher are now weighed together with the screen oversize. The weight is recorded upon a form similar to the one appended, under the head of "Sample from Coarse Rolls—Metallic Portion." Small chips for an assay sample are then cut from these metallics with a cold chisel, the sample is weighed, dried, and the dry weight of the entire metallic portion is calculated and recorded. The dried assay sample is set aside.

The screened portion is next weighed and the weight recorded upon the form as "Sample from Coarse Rolls—Mineral Portion." A moisture sample is taken from which the dry weight is calculated, while the sample itself is mixed, quartered down and passes on to the finer rolls.

The product from the fine rolls is passed over, say, a four-mesh screen, the oversize being re-rolled until it consists of bright clean metallics, which are weighed, sampled, dried and the weight entered under heading of "Sample from Finishing Rolls—Metallic Portion." The screenings are weighed, dry weight calculated, and entered as "Mineral Portion," following which they are mixed, quartered down to pan sample and sent to the drier.

The dried pan sample is ground in a "coffee mill," the product screened through a 20-mesh screen, and the metallics weighed and entered upon the record under "Pan Sample—Metallic Portion." The screened portion is likewise weighed and the weight recorded as "Pan Sample—Mineral Portion," after which it is mixed and sampled down upon the riffle or Jones sampler to a suitable weight for the pulp sample. This portion is rubbed down upon a bucking board to pass an 80- or 100-mesh screen. The fine metallics from this screen are gathered carefully and wrapped in a piece of glazed paper, while the pulp itself is weighed, and the weight recorded under "Pulp sample, weight of pulp."

The pulp sample, the samples of metallics from the coarse and fine rolls and all the metallics from pan and pulp samples are sent to the assayer, properly marked with lot number and description of contents, together with the records of weights.

Upon receiving the samples the assayer weighs the metallics from the pulp sample upon an analytical balance, and assays the pulp and each set of metallics separately. In determining silver and gold, it is best to wrap several portions of each set of metallics in lead foil and scorify and cupel. Combine the buttons of each set, weigh and take the average. Do not expect to get close checks on the several buttons of each set, for although the value in native metals is usually very uniformly distributed throughout the metal itself, the individual pieces will vary, according as more or less gangue has been imbedded in their surfaces, from the hammering in the cleaning process. By taking an average of several buttons the errors are minimized and become infinitesimal when the assay values are calculated back to the ore.

In case of base metals, which are to be determined in the wet way (as native copper ores for example), weigh out portions of 15 to 30 or even 100 grams of the metallics, dissolve and dilute to a given bulk; then take a convenient portion for the determination.

After making all the determinations the value of the ore is calculated by applying the following rules:

Rule I. Multiply the weight of the pulp by its assay. Multiply the weight of the pulp metallics by their assay. Add these two products, and divide by the weight of the pulp plus the weight of the pulp metallics.

Rule II. Multiply the weight of the "Mineral Portion" of the "Pan Sample" by the final result obtained by Rule 1. Multiply the weight of "Pan Metallics" by this assay. Add the products and divide by the weight of the metallic portion plus weight of mineral portion of the "Pan Sample."

Rule III. Multiply the weight of the "Mineral Portion" of "Sample from Finishing Rolls" by the final result obtained from Rule II. Multiply the weight of the "Metallic Portion" of "Sample from Finishing Rolls" by its assay. Add to the products and divide by the weight of mineral portion plus the weight of metallic portion of "Sample from Finishing Rolls."

Rule IV. Multiply the weight of "Mineral Portion" from "Sample from Coarse Rolls" by the final result obtained from Rule III. Multiply the weight of "Metallic Portion" of "Sample from Coarse Rolls" by its assay. Add the products and divide by the weight of "Mineral Portion," plus the weight of "Metallic Portion," of "Sample from Coarse Rolls." This final result is the assay value of the lot.

Care must be taken that all weights are given in pounds or kilograms, and that assay values used throughout the calculation are the same. whether percentages, ounces or kilograms are used. In weighing small samples, give the weights as fractions of pounds or kilos, and not as ounces or grams, thus avoiding confusion and error.

If the sampling mill is equipped with automatic samplers, it will be necessary to stop the samples in such a position that the entire sample will be delivered to a convenient place where it may be screened by hand, and the metallics separated out, after which the samplers are again set going and the "mineral portion" is run again through crushers, rolls and samplers as usual.

The operator may modify the method to suit his particular case, and accurately sample native metal ores. Even when, as is often the case upon examination work, no crushing machinery is available, bearing in mind that the method is based upon

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separating the metallics too coarse to pass a given mesh screen, and carefully ascertaining the relative proportions of metallic and mineral portions after each crushing and before quartering to smaller bulk.

A model calculation upon a native copper ore is here given, to show more clearly the application of the rules. The figures are taken from the form appended.

By Rule I.

$0.572 \times 0.123 = .070356$
$0.028 \times 0.778 = .021784$

$.092140 \div 0.600 = 0.1535$

By Rule II.

$9.800 \times 0.1535 = 1.50430$
$.950 \times 0.811 = .77045$

$2.27475 \div 10.750 = 0.2116$

By Rule III.

$668 \times 0.2116 = 141.3488$
$28 \times .834 = 23.3520$

$164.7008 \div 696 = 0.2366$

By Rule IV.

$11.155 \times 0.2366 = 2639.273$
$495 \times .792 = 392.040$

$3031.313 \div 11.650 = 0.2602$

The last result obtained, 0.2602, represents the proportion of copper in the sample, which reduced to percentage reads 26.02 per cent.

New Blast Furnaces.

The American Iron and Steel Association furnishes the following list of blast furnaces under construction on Aug. 1. The table below shows the situation of these furnaces; their size and estimated yearly capacity in tons of pig iron; and the fuel to be used:

	State.	Size.	Capacity.	Fuel.
Bethlehem	Penna.	90x22 ft.	144,000	Coke
Carrie No. 6	"	85x22 "	219,000	"
Carrie No. 7	"	85x22 "	219,000	"
Midland No. 2	"	85x21 "	150,000	"
Perry No. 1	"	75x15 "	100,000	"
Josephine	"	80x20 "	140,000	"
Ensley No. 5	Ala.	87x21 "	120,000	"
Etowah No. 1	"	75x17½ "	65,000	"
Haselton No. 2	Ohio.	85x19 "	140,000	"
Haselton No. 3	"	85x19 "	140,000	"
Toledo	"	80x20 "	135,000	"
Gary No. 1	Indiana.	88x21½ "	150,000	"
Gary No. 2	"	88x21½ "	150,000	"
Gary No. 3	"	88x21½ "	150,000	"
Gary No. 4	"	88x21½ "	150,000	"
Joliet No 4	Illinois.	90x22 "	165,000	"
Federal	"	75x18½ "	100,000	"
Mayville B	Wis.	77x17 "	80 000	"
Minnequa F	Colo.	85x20 "	125,000	"
Palmert'n No. 2	Penna	70x14 "	20,000	Anth.
Lebanon	"	"	"	Charc'l

The Palmerton anthracite furnace is owned by the New Jersey Zinc Company, and will make spiegeleisen from the residuum of zinc ores from Franklin Furnace, N. J. The Lebanon charcoal furnace is building for experimental purposes, and will not make pig iron for sale.

Of the list given, nine furnaces, with a total yearly capacity of 975,000 tons, are expected to be finished and in blast before the end of the present year; the others will not be ready for work until 1907. The total number of furnaces under construction on Aug. 1 was 21, the total productive capacity being 2,642,000 tons pig iron and 20,000 tons spiegeleisen yearly.

The first shipment of calcined magnesite has been made from Delagoa bay, Transvaal.

A Negative Experience with Sodium Cyanide.

BY WILLIAM MAGENAU.

Ever since the introduction a few years ago of an alkali cyanide so high in sodium that the proportion of contained cyanogen expressed as KCy went above 100 per cent., conservative cyaniders have been eager for evidence of its results as compared with those obtained with the well known mixture in which potassium predominates. Manufacturers turned out a salt containing a larger and larger proportion of sodium, making the apparent percentage of KCy approach nearer and nearer to 100, and leading the unthinking to assume that this meant freedom from impurities. The mixture seemed to have the same effect chemically as pure KCy; and finally a practically pure sodium cyanide was put on the market, and can now be purchased at approximately the same price per unit of cyanogen. Certain advantages are claimed for the sodium salt, as follows:

1. Greater concentration in cyanogen, hence a saving in transportation.
2. Greater solubility, saving time in the mill.
3. Convenience in handling, by reason of its manufacture into 2-lb. blocks.
4. Greater freedom from impurities.

Various cyanide plants have used the sodium cyanide successfully, e.g., the Athabasca mine in British Columbia and the Palmarejo in Chihuahua, Mex.; but so far as I have seen, the technical press has not recorded any failures, excepting indefinite mention of instances in Nevada and elsewhere. It will be in place, therefore, to give an experience of mine as a caution that laboratory tests should in every case be made before using the sodium salt in a mill.

The circumstances were these: A large quantity (some 20 tons) was purchased for a Western plant and put in storage until the KCy on hand should be used up. When this occurred, we assumed from the usually identical chemical relationships of K and Na, and from the experience of neighbors (operating on dissimilar ore, however), that the new salt would work, and a new ore-charge of 100 tons was treated therewith. The first solution drawn off contained only about one-half the usual amount of gold, and the net extraction from the charge was 40 per cent. against the regular returns of 75 per cent. This same solution was brought up to strength with fresh Na Cy, thus making the proportion of K present still less, and the extraction on the next charge of 100 tons dropped to about 20 per cent. The situation was alarming, indeed, and was only relieved when the solutions were brought up with KCy, which had been rushed in by express. Laboratory tests confirmed the mill experience, though about 50 per cent. was usually extracted in the small tests against 75 to 85 per cent. with KCy under identical conditions.

It seemed incredible that the element sodium should be responsible for this havoc, and I made careful tests for impurities. The salt tested to the equivalent of 130 per cent. KCy, and was therefore almost absolute Na Cy. A slight amount of sulphide was present, but not nearly so much as was found in the KCy which gave good extractions. We sent to a neighboring mine, which was successfully using a diffrent brand of NaCy, and this gave us in the laboratory somewhat better results, but still 10 to 20 per cent. below normal. As a final verification, I prepared a large sample of the crushed ore (which was complex material carrying sulphides of copper, iron and arsenic), and ran parallel tests with three brands of KCy (one of these being Merck's chemically pure), and the two brands of Na Cy. The KCy extractions were all above 80 per cent. and the NaCy between 50 and 60 per cent. The chemical problem of treating this particular ore was one of great complexity, and several theories were followed up in the hope of finding a cause for these results, but without success.

Aside from such prohibitive effects as poor extractions, we did not find that the NaCy had the advantages claimed, excepting of course as to less weight per unit of cyanogen. As made by this English firm, it was cast into 50-lb. blocks, hard to break and handle; it did not dissolve any more readily than KCy; nor does it appear that its lack of impurities is of great importance, excepting indirectly, since the ordinary impurities of KCy do no harm.

Abstracts of Official Reports.

Colorado Fuel and Iron Company.

The fifteenth annual report of this company gives an account of its operations for the year ending June 30, 1906. The balance sheet at the close of the year shows that the capital liabilities were: Common stock, $30,133,000; preferred stock, $2,000,000; funded debt, $19,938,000. The funded debt was reduced $31,000 during the year.

The production of the company's mines and works during the year was as follows, in tons:

	Total.	Used by Co.	Sold.
Coal mined	5,056,378	2,623,372	2,438,266
Coke made	1,095,133	637,156	406,744
Iron ore mined	803,384	804,973	.....
Limestone quarr'd	369,921	369 921	.....
Iron & steel made	1,900,168	1,472,733	407,561

In addition to the iron ore mined the company purchased and used 72,992 tons of Lake Superior ore. Of the coal used by the company 149,811 tons were consumed in operating mines; 488,533 tons at the iron and steel plants; and 1,984,808 tons in making coke. The latter item gives an average of 1.81 tons of coal consumed in making 1 ton of coke.

The financial statement is as follows:

	Gross.	Expenses.	Net.
Iron dep't.....	$12,454,643	$10,883,679	$1,570,964
Fuel dep't.....	9,499,317	8,264,273	1,235,044
Denver retail....	366,085	342,230	23,855
Total.....	$22,320,045	$19,490,182	$2,829,863
Less general expenses.....			270,834
Net earnings.....			$2,559,029
Interest and other income.....			505,700
Total net income.....			$3,064,729
Interest, sinking funds, rents, etc..			2,392,917
Balance to profit and loss.....			$ 671,812

The president's report says:

"During the past year no strikes or differences of any moment have occurred between the company and its employees, and all labor conditions are quite satisfactory, except a shortage of about 1000 men, to whom, if available, employment could be given at present time.

"There is under contemplation the opening of two, and probably three, additional coal mines in Las Animas county, Colo., which will not only add to the tonnage of coal for commercial purposes, but will enable the coke ovens in that district, where the largest number are located, to be more fully operated, materially increasing the supply of coke both for commercial purposes and for consumption at the Minnequa works.

"The development of the iron-ore properties at Fierro, New Mexico, and Chicago and Sunrise, Wyo., has progressed satisfactorily, and the quantity of ore now blocked out and in sight is in excess of that at any period in the history of the company. The work of expanding this class of raw material will continue, and it is now expected that enough iron ore will be shown to meet the growing demand for many years.

"During the past year, four of the five blast furnaces have been in constant operation, and in the near future the fifth will be placed in commission. In order to have one furnace at all times available, in case of stoppage of any one of them, contracts have been made for the completion of an entirely new furnace, upon which a large amount of money was expended some years ago and work suspended thereon. With the augmented supply of coke and iron ore above mentioned, this battery of six blast furnaces will provide an ample supply of pig iron for the increased operations of the Minnequa works and its finished marketable products.

"Contracts have been made for doubling the capacity of the open-hearth plant at Minnequa by the addition of six 50-ton furnaces, together with the erection of a new calcining plant and a hot-metal storage tank, to facilitate the operations of that department. At the rail mill, also at Minnequa, additions have been made to the finishing department thereof, and that plant is being generally reinforced to such an extent that an increased output of finished rails may be expected.

"Contracts have also been made whereby the production of the bolt and spike factories will be about doubled, and the No. 2 rod mill (heretofore unfinished) has been converted into a rolling mill for the augmented production of rounds and squares for subsequent manufacture into bolts and spikes.

"During the past year expenditures for improvements and betterments at the Minnequa works, coal and iron-ore mines, and limestone quarries, have been made upon a generous scale, and these properties are in good condition for continuous operation.

"The water supply which is used for the works at Minnequa has been inadequate and uncertain, and there has been constant danger of its complete failure. After mature deliberation, the board of directors approved of the construction of a conduit, or canal, about 37 miles in length, to bring water from the Arkansas river to the reservoirs located on the plains about 5 miles southwest of the Minnequa works, where it will be impounded and clarified and then conducted to the various points where it will be utilized in the works. It will be possible to complete the entire system by the end of the present calendar year, after which a daily supply of 55,000,000 gal. will be provided and with sufficient storage capacity to guard against any probable contingency that may arise to interrupt the constant flow to the works."

The Southern Railway Company has established a mineralogical bureau, in connection with its Land and Industrial Department. The bureau has its headquarters at Chattanooga, Tenn., and is in charge of E. D. Stone.

Patents Relating to Mining and Metallurgy.

UNITED STATES.

The following is a list of patents relating to mining and metallurgy and kindred subjects, issued by the United States Patent Office. A copy of the specifications of any of these will be mailed by THE ENGINEERING AND MINING JOURNAL upon the receipt of 25 cents. In ordering specifications, correspondents are requested to name the issue of the JOURNAL in which notice of the patent appeared.

Published Week Ended Aug. 14, 1906.

828,296. CONVEYER—Clarence K. Baldwin, New York, N. Y., assignor to The Robins Conveying Belt Co. Filed March 18, 1903.

828,310. BLAST FURNACE—Ledyard Heckscher, Radnor, Pa. Filed Nov. 2, 1903.

828,331. CONVEYER—Lincoln Moss, New York, N. Y., assignor to The Robins Conveying Belt Company. Filed July 29, 1903.

828,341. DRIVE FOR CONVEYERS—Thos. Robins, Jr., and Edgar E. Hersh, New York, N. Y., assignors to The Robins Conveying Belt Company. Filed Nov. 17, 1903.

828,427. COALING STATION—William J. Selleck, Riverside, Conn. Filed April 23, 1902.

828,431. EXCAVATING AND LOADING APPARATUS—George Snook, Ashland, O. Filed May 8, 1905.

828,527. SAMPLER FOR SAMPLING SANDS IN CYANIDE TANKS AND OTHER MATERIAL—Oliver P. Ankeny, Deadwood, S. D. Filed Jan. 17, 1906.

828,583. MANUFACTURE OF IRON—Otto Thiel, Landstuhl, Germany. Filed April 28, 1906.

828,590. APPARATUS FOR INTRODUCING POWDERED ELEMENTS INTO CASTINGS—Frank G. Wright, Indiana Harbor, Ind., assignor to American Steel Foundries, Chicago, Ill. Filed Feb. 23, 1906.

828,684. ROCK DRILL — John E. Sales, Wrangell, Alaska. Filed May 10, 1905.

828,759. PROCESS OF MAKING ALKALI-METAL OXIDES—Georg W. Meiser, Ludwigshafen-on-the-Rhine, Germany, assignor to Badische Anilin und Soda Fabrik, Ludwigshafen-on-the-Rhine, Germany. Filed Oct. 14, 1902.

828,850. PROCESS OF TREATING VANADIUM ORES—Justin H. Haynes and Wilber D. Engle, Denver, Colo. Filed Dec. 1, 1905.

Published Week Ending Aug. 7, 1906.

827,088. STOP-MOTION FOR PIT CAGES, HOISTS, ETC.—Gustav Dünkelberg, Essen-on-the-Ruhr, Germany. Filed Dec. 8, 1905.

827,089. CALCINING FURNACE—Thomas A. Edison, Llewellyn Park, N. J. Filed Jan. 2, 1902.

827,115-827,116. METHOD OF ELECTROSTATIC SEPARATION — Greenleaf W. Pickard, Amesbury, Mass., assignor, by mesne assignments, to Huff Electrostatic Separator Company, a corporation of Maine. Filed Sept. 27, 1905.

827,118. FURNACE-STOCK DISTRIBUTER. John D. Pugh, Baltimore, Md. Filed Sept. 8, 1905.

827,134. PROCESS OF BRAZING METALS. Louis L. White, Portland, Ore., assignor to Charles E. Ladd, Portland, Ore. Filed June 16, 1905.

827,144. EXCAVATOR SHOVEL—Lewis W. Connell, Joliet, Ill. Filed May 9, 1906.

827,155-827,156. BLAST-FURNACE-CHARGING APPARATUS—Walter Kennedy, Bellevue, Pa. Filed Oct. 26, 1905.

827-179. PROCESS OF ELECTROLYTICALLY DISSOLVING IRON-OXIDE SCALE—Charles J. Reed, Philadelphia, Pa. Filed June 26, 1905.

827,180. PROCESS OF ELECTROLYTICALLY REMOVING SCALE AND PRODUCING IRON SULPHATE—Charles J. Reed, Philadelphia, Pa. Filed Jan. 2, 1906.

827,247. HOISTING AND CONVEYING APPARATUS—Frederick W. Lovell, Cleveland, Ohio, assignor to The McMyler Manufacturing Company, Cleveland, Ohio, a corporation of Ohio. Filed April 9, 1906.

827,378. ART OF MAKING COPPER-COATED IRON OR STEEL SHEETS—William P. Lewis, Canton, Ohio. Filed Nov. 23, 1905.

827,399-827,400. APPARATUS FOR PURIFYING WATER—Solomon L. Sheuerman and Juan F. Hand, Des Moines, Iowa; M. N. Baker, administrator of said Juan F. Hand, deceased. Filed May 20, 1905.

827,418. PROCESS OF REFINING ZINC AND OTHER METALS—Jacob Callmann and Rudolf Bormann, Berlin, Germany. Filed Feb. 15, 1906.

827,459. DRILL-GRINDING MACHINE—Ralph L. Morgan and James N. Heald, Worcester, Mass., assignors to The Heald Machine Company, Worcester, Mass., a corporation of Massachusetts. Filed Sept. 27, 1905.

827,498. METALLURGICAL FURNACE—George H. Benjamin, New York, N. Y. Filed May 20, 1903.

827,499. APPARATUS FOR MAGNETIC SEPARATION—Gustaf G. Bring, Petersfors, Sweden. Filed Feb. 10, 1905.

827,502. APPARATUS FOR CONVEYING AND COOLING ORE—Jeannette L. Campbell, Melrose, Mass., executrix of Henry F. Campbell, deceased. Filed Dec. 14, 1905.

827,517. PROCESS OF BURNING CEMENT CLINKER BY FLAME IMPINGEMENT AND APPARATUS THEREFOR—Carleton Ellis, White Plains, N. Y. Filed Dec. 28, 1905.

827,560. COAL TIPPLE—James S. Pates, Monongahela, Pa., assignor, by direct and mesne assignments, to William W. Keefer, James S. Pates and Samuel A. Scott, Pittsburg, Pa., a copartnership. Filed Feb. 16, 1906.

827,620. TREATING ORES — Francis J. Crane, Denver, Colo. Filed Aug. 17, 1905.

827,226. ROASTING FURNACE — Herbert W. Fox, Colorado Springs, Colo. Filed Feb 21, 1906.

827,354. DUMPING AND CAGING APPARATUS FOR MINE CARS—Thomas Fisher, Desloge, Mo., assignor of one-third to John N. Shannon, Desloge, Mo., Filed Sept. 29, 1905.

827,457. EXCAVATOR—William R. Martin, Idaho Falls, Idaho. Filed Nov. 29, 1905.

Personal.

Mining and metallurgical engineers are invited to keep THE ENGINEERING AND MINING JOURNAL informed of their movements and appointments.

J. W. Finch, of Denver, is at present in Nevada.

W. G. Swart, of Denver, Colo., is visiting New York.

J. Trowbridge Bailey has returned to New York from a trip to Brazil.

Louis S. Cates left Bingham, Utah, last week, for a trip of two weeks to Boston and New York.

E. W. Sebben, left Denver last week for a three weeks' professional trip to the Vulture district, Arizona.

A. J. Dwight left New York last week, for Mexico. His address for the present will be at Tezuitlan, Puebla, Mexico.

J. P. Hutchins has returned to New York from an extended trip through California and the Rocky Mountain States.

Rolla B. Watson, of New York, was recently in Ketchikan mining district, Alaska, in the interests of Eastern clients.

O. E. Jager has left Mexico to take charge of the blast furnace plant of the Arizona Smelting Company, at Humboldt, Arizona.

O. H. Fairchild has been appointed manager of the Triangle Mining Company's properties on Bruce hill, Leadville, Colorado.

W. P. Noble, of Leadville, Colo., passed through New York this week on his way to Punta Arenas, Chile, on the Straits of Magellan.

R. M. Fisher has returned to Denver, Colo., from a professional trip to Arizona and is at present examining property in Clear Creek county Colorado.

H. C. Hoover, of London, was in New York last week. He is now at Lake George, N. Y., where he purposes spending two or three weeks.

James E. Roderick, chief of the Pennsylvania Department of Mines, is being mentioned for the presidency of the Lehigh Coal and Navigation Company.

John A. Kirby, who has been manager of the Montana-Tonopah mine at Tonopah, Nev., for over a year, has resigned his position, and will open an office at Tonopah.

R. E. Wipfler, of Hartshorne, I. T., chief engineer of the Rock Island Coal Company, has resigned and has been succeeded by H. D. Easton, formerly his assistant.

R. Gilman Brown has just returned to San Francisco from a trip to the Ymir district in British Columbia. He has established his office at 1537 Bush street, in San Francisco.

S. F. Emmons, of the United States Geological Survey, passed through Denver last week, on his way to attend the International Geological Congress at the City of Mexico.

Peter McKenzie, of the Chibogamoo Gold and Asbestos Company, has recently returned to Montreal accompanied by H. Massam from a visit to the Chibogamoo region of Quebec.

George Bonney has resigned from the Union Consolidated mine at Nevada City, Cal., and has taken the position of superintendent of the Red Cross mine at Omega in the same county.

Allen Hastings Rogers has opened an office at 82 Beaver street, New York, as consulting engineer, for the operation or examination and valuation of mining properties or their equipment.

A. L. Agatin, of Duluth, has returned to his home after closing, in Boston, the purchase of the Lindsey-Cananea and other lands at Cananea, Sonora, for the Cananea Central Copper Company.

G. W. Borrowe, recently superintendent of the Sons of Gwalia mine, has been appointed general manager of the Great Boulder Perseverance Gold Mining Company, at Kalgoolie, Western Australia.

Thomas A. Edison is in Montreal and will shortly visit Cobalt. He states that the present high price of cobalt is prohibitive of its commercial use for the development of electrical power for automobiles.

Franklin W. Smith and Hoval A. Smith, of Bisbee, Ariz., have been in Duluth this week on business connected with the Globe Consolidated and other copper properties in Arizona, in which they are interested.

M. D. Kelly, who succeeded Mark B. Kerr as superintendent of the Jumper Gold Mine Syndicate, Stent, Tuolumne county, Cal., has resigned his position and Neil Cochrane, of British Columbia, has taken the place.

F. T. Locke, has resigned as superintendent of Ticonderoga Machine Works to take effect Sept. 1, and has accepted a position as manager of sales in the New York office of the Mine and Smelter Supply Company.

Henry Stern, of New York, has succeeded the late Geo. H. Robinson as president and managing director of the Britannia Copper Syndicate, Britannia Smelting Company, and allied interests in British Columbia and Southeast Alaska.

Wm. J. Nettle, formerly of Grass Valley, Cal., has been appointed superintendent of the Argonaut Mining Company, of Jackson, Amador county, to succeed the late J. B. Francis. He has been for some years foreman and shift-boss of the Argonaut.

W. S. Newcomb, of McAlester, I. T., chief engineer of the Great Western Coal and Coke Company and the Osage Coal and Mining Company, had a severe attack, Aug. 11, thought to have been caused by ptomaine poisoning. He is reported to be recovering.

R. R. Sterling, chief engineer of the Colorado Fuel and Iron Company in its Southern district, with headquarters in Trinidad, Colo., has resigned in order to become general superintendent of the Tacoma Smelting and Refining Company at Tacoma, Washington.

Warner Miller, of New York, president of the Dominion Copper Company, H. H. Melville, of Boston, and A. M. Wickwire, of New York, directors in the same company, were at the mines and smelters of the company last week, and visited other British Columbia properties in that district.

William Busby, president of the Great Western Coal and Coke Company, and the Osage Coal and Mining Company, of McAlester, I. T., and James Elliott, of Haileyville, I. T., are spending the summer at Colorado Springs. Mr. Elliott is general manager of the Hailey-Ola Coal Company.

President Thos. F. Cole, of the Oliver Iron Mining Company, G. A. Tomlinson and others, of Duluth, are at Watersmeet, Mich., for a short rest. Mr. Cole has recently returned from Cananea, Sonora, where he completed the inspection of properties that have since been bought by the Cananea Central Copper Company, of Duluth.

A. P. Low, director of the Geological Survey of Canada, spent the early part of August visiting the chief mines and reduction works of the West Kootenay and Boundary districts of British Columbia. He is expected to proceed shortly to the Similkameen district en route to Victoria, whence he will probably go to Mexico to attend the Geological Congress.

Accompanying a party of directors of the Dominion Copper Company who lately visited the company's mines and smelter in the Boundary district of British Columbia, were M. M. Johnson, of Salt Lake City, Utah, the company's consulting engineer; Samuel W. Traylor, of the Traylor Engineering Company, New York, and D. E. Woodbridge, of Duluth, Minnesota.

A. C. Lawson, head of the Department of Geology, University of California, has gone to Mexico to attend the International Geological Congress which meets in the City of Mexico, Sept. 9. Prof. Lawson will visit Europe before his return and Prof. Geo. D. Louderback, of the University of Nevada, will fill the chair during the absence of Prof. Lawson, which is expected to last a year.

Prof. Mansfield Merriman has been granted a year's absence from the chair of civil engineering at Lehigh University, South Bethlehem, Penn., and will give the greater part of that time to practice as a consulting engineer, being associated with Clarence W. Hudson, at 45 Broadway, New York. Mr. Hudson has resigned as

assistant engineer of the Phœnix Bridge Company.

K. Kondo, superintendent and acting chemical engineer of the Hoden Oil Company, of Echigo, Japan, is in California visiting the various oil refineries, and will shortly visit Pennsylvania and other eastern oil-producing States. His company has recently made a contract for the shipment of 10,000,000 bbl. of California oil to Japan, to be used for fuel purposes, mainly on steamships. This oil will come from Santa Barbara county. Another large contract will shortly be let for oil from the Kern county fields. Mr. Kondo brought letters from the Imperial Geological Survey of Japan to Charles G. Yale, of the Division of Mineral Resources of the Geological Survey, San Francisco.

Obituary.

Horace Dickson Mayhew, son of President Mayhew of the Cape Breton Coal, Iron & Railway Company, who has been representing in Canada the interests of his father, who resides in England, committed suicide at Mira, N. S., Aug. 11, by cutting his throat. No reason for the act is known.

Edgar Vallentine Bensusan, who died recently on board the "Briton" while traveling from Cape Town to London, was a member of an old Australian mining family. He was educated at the leading colleges in Sydney, and studied mining at the Royal School of Mines, London, of which he was an associate. He was for some years metallurgist at the Sunny Corner silver mine, New South Wales, and manager of the Cullen Bullen colliery, Butlers, and the Dutchmen's tin mines and other properties in the same State. He was also for a number of years a member of the firm of E. & A. Bensusan, consulting mining engineers, Sydney. In recent years he has been prominent in South and West Africa. While on the Gold Coast, his wide Australian experience enabled him to be of great service in rescuing a number of valuable mines from the trouble they had got into through inefficient management. Mr. Bensusan died at the early age of 42 from, it is believed, a fever contracted during his residence on the West coast. Mr. Bensusan was widely known to mining men throughout the world, as his professional duties required much travel; while his abilities and sterling character made him esteemed by all who had the privilege of meeting him. His brother, and former partner, A. J. Bensusan, is manager of the Ouro Preto gold mines, Brazil.

Societies and Technical Schools.

Toronto Industrial Exhibition—A feature of this exhibition, which will open in Toronto, Ont., Aug. 27, will be a display of Cobalt ores from the leading mines. The Ontario government will also show samples from the vein recently opened in the Gillies timber limit.

Tokyo Imperial University—The 1905-1906 calendar of this foremost Japanese university outlines the courses of study in law, medicine, engineering, literature, science, agriculture and military arts. The engineering college has 29 professorships, civil and mining engineering having four chairs each. The college of engineering had 549 students enrolled in September, 1905, and 6443 students in all have graduated from the university. It is noteworthy, that, almost without exception, the professors and instructors are Japanese.

Industrial.

The Willson-Maeulin Company, 110 Liberty street, New York, has opened the business of manufacturing and importing pyrometers for all purposes in connection with metallurgical works.

The Virginia Electrical Company, is now operating the electric furnaces at Holcomb Rock, Va., formerly owned by the Willson Aluminum Company. The furnaces are at present making ferrosilicon.

In referring (in our issue of June 23, p. 1210) to a purchase of 1104 Johnston vanners from the Union Iron Works, San Francisco, for use in the Utah Copper Company's new mill, a typographical error gave the number as 110 vanners.

Several companies have been merged to form the Link-Belt Company. These were the Link-Belt Engineering Company, Philadelphia; the Ewart Manufacturing Company, Indianapolis, and the Link-Belt Machinery Company, Chicago. The consolidation was effected by the Link-Belt Machinery Company, of Chicago, purchasing the plants and assets of the Ewart Company, of Indianapolis, and the Link-Belt Engineering Company, of Philadelphia. It controls three splendidly equipped plants at Chicago, Indianapolis and Philadelphia and the line of manufacture covers the entire field of conveying, elevating and transmission machinery, malleable and machine-made driving chains. The officers of the company are as follows: James M. Dodge, Philadelphia, chairman of board; Charles Piez, Philadelphia, president; Glenn G. Howe, Indianapolis, first vice-president; Staunton B. Peck, Chicago, second vice-president; S. Howard Smith, Philadelphia, treasurer; P. G. Reid, Philadelphia, assistant treasurer; Dyke Williams, Chicago, secretary; Edward H. Burr, Philadelphia, assistant secretary.

A number of Allis-Chalmers steam shovels have recently been ordered, notably for the southern phosphate fields. Four 70-ton shovels have recently been ordered for Florida, by H. L. Pierce and the Electric Phosphate Company, one shovel each, and the Prairie Pebble Phosphate Company, two shovels. The Dunnellon Phosphate Company, of Rockwell, Fla., has contracted for two 40-ton shovels. The Toronto Construction Company, has ordered a 70-ton shovel for use in Canada. This shovel is to be built after designs which are peculiarly Allis-Chalmers and with the following characteristics: Weight, 70 tons; capacity of dipper, struck measure, 2½ yd.; hight of point of boom above rail, 26 ft.; hight of frame, 19 ft.; clear hight of lift, 18 ft.; reach below rail, 3½ ft.; width of cut at 8-ft. elevation, 54½ ft.; gage of track, 4 ft., 8½ in.; capacity 2000 to 3000 cu.yd. per ten hours. The hoisting engines are 12x12 in. of the link-reverse type, direct geared to hoist drums. The swinging and thrusting engines are 7½x7½-in., reversing duplex type. The boiler is of the locomotive fire box type, 54 in. diameter and 13½-ft. long, built for 140 lb. working pressure. The car is 9 ft., 8 in. wide, and 40 ft., 11 in. long over all. The trucks are of the steel-diamond pattern of the Master Car Builders. The draft rigging is equipped with Tower automatic couplers and two link bar chains to drive both forward and rear trucks. A steel water-tank, containing 1100 gal., completes the equipment.

Trade Catalogs.

Receipt is acknowledged of the following trade catalogs and circulars:

E. Keeler Company, Williamsport, Penn. Boilers; Pp. 48, illustrated; paper, 8x5 in. 1906.

Sparta Iron Works Company, Sparta, Wis. Catalog of Well-Drilling Apparatus and Appliances; pp. 96, illustrated; paper, 6x9 in.

The Westinghouse Companies Publishing Department, Chicago and New York. Industrias Y Productos De Westinghouse. Pp. 63, illustrated; paper, 6x8 in. Booklet written in Spanish for Westinghouse Companies' various works.

Christman Company, Massillon, Ohio. List of Tools and Machinery Furnished with High Grade Drilling Machines. Pp. 16, illustrated; paper 6x9 in. 1906. Also catalog of Drills, Wheels, Cars, Brakes and Track. Pp. 19, illustrated; paper, 6x9 in. 1906.

Stanley-G. I. Electric Manufacturing Company, Pittsfield, Mass. G. I. Outlet Boxes; Pp. 8, illustrated; paper, 6x8 in. 1906. Also Circulars No. 786—Arc Light, and 787—Direct-Current Motors and Generators; Pp. 12, illustrated; paper, 2x6 in. 1906.

Construction News.

Dodgeville, Wisconsin—The Williams Brothers mine is to be equipped with an electric power plant. C. W. McIlhon, Mineral Point, Wis., has charge.

Mineral Point, Wisconsin—The Clark mine is to be equipped with a concentrating plant. W. A. Jones, Mineral Point, is manager.

Platteville, Wisconsin—The Empire Mining Company is considering the question of installing a central electric power plant. Address at Platteville.

A new concentrating plant is to be put in at the Kennedy mine. Thomas Aide, Platteville, is superintendent.

Boise, Idaho—The Big Giant Gold Mining Company is preparing to erect a mill at its mine. O. E. Jackson, Boise, Idaho, is general manager.

Goldsprings, Utah—The Jenny Gold Mining Company, Charles A. Short, manager, is about ready to enter the market for mill equipment.

Argentina, South America—Charles L. Clarke informs us that he is in the market for materials and machinery for a cyanide plant and copper smelter. Mr. Clarke's address is Avenida de Mayo, 586, Casilla Correo 1612, Buenos Aires, Argentine Republic.

Bingham, Utah—The Utah Apex, North Utah and Utah Development Companies are practically under the same control, and a movement is on foot to build a mill on the site of the old Markham plant in lower Bingham, to be used jointly. Walter C. Orem, of Salt Lake City, is manager.

Lake of the Woods, Ontario—The W. L. McCulloch Company of Ypsilanti, Mich., of which Geo. P. Good is president, is installing an ore pulverizer in the Lake of the Woods gold area, near Kenora. The treatment of ore by this plant is said to be a more economical process than that of the stamp mill.

Grand Forks, British Columbia—The Granby Consolidated Company is replacing the wooden framing of the entire furnace building at its smelting works at Grand Forks by structural steel. The dimensions of the building are about 71x400 ft. An extension of the blowing-engine room, 70 ft. long by 56 ft. wide forming an L, is being made, thus about doubling the size of this building. For a 90,000-gal. wood water tank, one of steel, to hold about 100,000 gal., is being substituted. An automatic converter-slag conveyor and elevator is being installed, similar in design and construction to those in use at the big smelting works at Anaconda, Montana. The conveyor consists of a number of half-inch thick pressed-steel molds running over small rollers or wheels. The converter slag is poured hot into these molds, but during the time taken to convey it to a receiving bin it solidifies. From this bin it is taken in railway dump cars to the regular furnace-charging bins and thence charged into the blast furnaces. This method of dealing with the converter slag results in a considerable saving of labor.

Special Correspondence.

San Francisco. Aug. 15.

State Mineralogist Aubury has succeeded in getting the Government officials to examine into the wholesale absorption of timber and mining land in certain counties in this State by various individuals. The methods adopted in getting hold of these large areas are to be investigated and the character of the lands determined. In addition to A. C. Shaw, of the Forest Service, and Edward C. Finney, law examiner of the General Land Office, the Government investigating party will include L. G. Gillett, J. A. Dorsey and W. L. Walker, of the Geological Survey, who have been associated in the work of the division of mining and mineral resources. The investigation is the result of conditions which have existed for some years in many of the forest reservations where the purpose of parties entering mineral claims was to secure the timber rather than develop the mines. The Forest officials point out that it is the duty of the Forest Service to encourage and assist the operation of legitimate mining enterprises in forest reservations, but an attempt will be made to ascertain the facts about fraudulent claims. Large tracts of timber have been located where valuable mineral is known to exist and this matter is to be investigated also. The first work will be done in the counties of Butte and Plumas, where numbers of locations have been made under the mining, timber and stone laws. Several thousand placer locations are involved in these investigations. The annual assessment work has been done regularly upon them all, but the method of original location is to be examined.

The Dingee-Crocker-Bachman Syndicate, already owning the largest cement plant in the State, has added to its holdings by the purchase of 8000 acres of land carrying lime and clay, 12 miles from Santa Cruz, at San Vincente. This was formerly the property of the Santa Cruz Lime Company. The new owners style themselves the Santa Cruz Portland Cement Company. A three-quarter interest in the old company has been acquired. Another extensive cement plant with a daily output of 6000 barrels is nearly finished and still another will be built. The same people own the extensive factory in Napa county.

At San Bruno point, about 10 miles south of this city, on the bay shore, the American Smelters Securities Company has 600 men and 400 teams, with steam shovels, etc., grading for the site of the new smelter. A 48-ft. fill is being made between two hills, where the main buildings and the ore-bins are to stand, a half mile west of the bay shore. The wharf will extend at least 1500 ft. into the bay from San Bruno point, and will be completed in five months. Deep cuts are being blasted through the western hills to admit a spur from the bay-shore cut-off of the Southern Pacific. This spur will extend to the water's edge, passing around the plant, and connect at the other end with the main line of the Southern Pacific, near Baden. Another spur track will run directly into the proposed buildings from the present main line. This company already owns the Selby, Tacoma and Everett smelting plants on this coast. The location of the new smelter at San Bruno point is considered a particularly desirable one by the smelting people. They declare that 95 per cent. of the prevailing winds blow from the west directly across the bay and that the fumes from the high stacks will not be injurious either to health or vegetation.

What will be the first quartz mill ever erected in Modoc county is now on the way from the East. J. M. Layman, manager of the Mines Venture Syndicate, established at Fort Bidwell, has just returned, after making arrangements for the machinery in Chicago. This company is heavily interested in the newly discovered mining district near Bidwell, and intends to push development work.

There has been considerable feeling at the Kennedy mine in Amador county over the failure of the company to put safety clutches on the skip as the miners had requested, and most of the underground men went on strike last week. Some 200 men were paid off and ordered to keep away from the mine premises.

On Saturday last, Attorney E. B. Davis, of San Francisco, acting for the stockholders of the Sunset Mining Company, redeemed the Old Glory mine from sheriff's sale, and it is believed the mine is to be pumped out and prospected. The mine is at Morris ravine, near Oroville, and was used by the notorious George W. Rumble, under the name of the Sunset Mining Company, as the basis for extensive manipulations. E. B. Davis, who redeemed the mine, assisted in prosecuting Rumble for the fraudulent use of the United States mails, for which Rumble was sentenced to 18 months in San Quentin. The mine was sold to satisfy a claim of $2500 brought by L. Hardynge.

It is announced that the gold from Alaska and the Klondike country will be minted in San Francisco this year, instead of at Philadelphia, where it has been sent for the past two years. Most of this gold is received at the Assay Office at Seattle, the next largest receiver being the Selby Smelting Company of this city. Between $20,000,000 and $25,000,000 in gold yearly comes from these northern regions.

The Halsted copper mine at Rich Gulch, Plumas county, has been sold to J. G. Williams and others of Los Angeles. The property is an immense deposit of low-grade copper ore and has been quite thoroughly exploited by the Halsted brothers during the past 20 years or more. The difficulty heretofore has been the in-

accessibility of the mine, it being in the cañon of the North Fork, approachable only by a precipitous pack trail. A few years ago Henry Ertz had the property bonded to an English company for some $700,000, but the deal fell through on account of the great preliminary expense which would be necessary to open it up. With the advent of the Western Pacific this disadvantage is overcome. The mine is situated so that the mining and milling can be done cheaply. The ore can be handled by gravity and it is easy to install an electric plant on the east branch, by which power may be furnished.

Bisbee. Aug. 18.

The Copper Queen Consolidated Company is sinking a new shaft in place of its old Holbrook, which has been caving badly; the new shaft will be near the old one, and is being driven from five levels, day and night shift. It is expected to be ready in about six months. Spray shaft, which lies near Holbrook, has been taking ore from the Holbrook territory of late and is worked very hard in consequence. The mines are having no trouble, however, in producing ore for the smelting works, and the latter are running full. Their copper production for July was a trifle under recent months, but that for August will be close to the average for the year. The company has not been sinking its new Sacramento shaft recently, on account of a lack of hoisting machinery, which had been ordered, but did not arrive till now. The shaft is designed to become the main producer of the company's workings, and will be connected underground with all properties of the Copper Queen by electric tramming. It will be a year or two before this shaft is completed and in commission for steady work.

Ores of the new Cole Company, at Cananea, the Cananea Central, have begun going to the Cananea smelter, and there is no more talk of their coming this side the line to the Calumet & Arizona smelter at Douglas. A much larger force of men will be put at work at once on the new Cananea properties, and developments and mining will proceed on the regular Cole plan of pushing and skill. It is stated that since the option on this property was taken by Mr. Cole and associates new orebodies of large value have been opened.

The Globe Copper Company has recently elected officers and completed its organization; this took place at Duluth, Minn., which is the head office of the company. Development work along the permanent plan outlined by the company is beginning and will be pushed. The company expects to be in good ore in a short time, and to be making small shipments to the Old Dominion smelter in the course of a few months.

It is stated that the Southern Pacific, whose desire to break into El Paso & Southwestern territory in this vicinity has been known for a long time, is to build down through this district by way of the Warren part of Bisbee, and connect at the boundary with a new line to Cananea, which shall eliminate Naco and materially shorten the road from its main line into central Sonora.

About three miles of grade for the Arizona Commercial Company's railroad from the Old Dominion to the company's mines has been completed, and tracks will be laid in a few weeks. The mines of the company continue to show good copper values and the 700 and 800 levels, now opening, are as high grade as has been hoped for.

Demorrata mine, near the new Cole property in Cananea camp, is to have a smelter and large new mine equipment.

Salt Lake City. Aug. 17.

The Independence group of lode claims near Goldsprings, Iron county, has been bonded to Short & Elliott, of that place. The purchase was made in behalf of the Jenny Gold Mining Company, of which Mr. Short is manager.

Mine owners at Alta are experiencing considerable difficulty in getting ore to market, owing to a scarcity of teams. Ore haulers have demanded an increase of 50c. a ton. The old schedule was $3.20 per ton.

The Nevada Northern Railway, now building to Ely, Nevada, from Cobre, on the main line of the Southern Pacific, is now within 12 miles of Ely. The road will be completed by September.

One furnace at the new Garfield smelter company, at Garfield, is in operation. Others will be in commission within a few days.

The ore and bullion settlements reported last week by Salt Lake banks aggregated $596,000.

It has been learned that the mill with which the Nevada Consolidated mines at Ely, Nevada, are to be equipped is to be much larger than first contemplated. The original plans called for a plant of 2500 tons daily capacity; later, it was decided to build one to handle 5000 tons and now a 10,000-ton plant is the talk.

David Keith and Thomas Kearns, of Salt Lake, have secured an extensive interest in the Success group of claims in the Duck Creek, Nevada, district from D. C. McDonald, the owner. The property is being equipped with a compressor and hoisting plant.

Col. J. N. Huston, of New York, has secured an option on the Ross and Buck mines and the Buck mountain portion of the Snowflake group near Fay, Nevada, and will organize a company to develop them.

The construction of the Western Pacific west from Salt Lake is progressing rapidly. Tracklaying is going ahead at better than a mile a day.

At the annual meeting of shareholders of the Black Diamond Mining Company, operating at Stockton, W. E. Beach, Lafayette, Ind., was elected president; Jasper R. Rand, of New York, vice president; W. C. Alexander, of Salt Lake, secretary and manager; C. W. Miller, of Indianapolis, treasurer; with T. Ellis Brown, of Salt Lake, the remaining director.

The Silver King Consolidated, operating at Park City, has filed an amendment to its articles of incorporation, increasing the capital stock from $1,000,000 to $2,000,000, divided into $5 shares.

A deal has been closed for the sale of the property of the Ely Mining and Milling Company, at Ely, Nev., to David Keith and Thomas Kearns, of Salt Lake.

Semi-weekly mail service has been established to Gold Butte, a new gold camp in southeastern Nevada, where considerable activity is in evidence at the present time.

The construction of the new aërial tramway system of the Utah Apex Mining Company at Bingham is progressing nicely and will be in operation in about 30 days, if the railroad spur to the lower terminal is finished in the meantime.

Denver. Aug. 20.

The International League of Press Clubs will meet in Colorado shortly, and a large amount of ore has been donated by the miners of Cripple Creek for the purpose of the manufacture of a gold brick to be presented to the one who writes the best story on the district.

Announcement has just been made here that William Sproule, after nearly 25 years continuous service in the employ of the Southern Pacific system, has resigned to become traffic manager of the American Smelting and Refining Company and its allied companies, with headquarters in New York.

The offer of the executors of the Stratton Estate to pay the inheritance tax, amounting to about $240,000, besides the accrued interest of about $38,000, provided the State will waive the latter item, will probably not be accepted by the State Auditor.

The American Steel and Wire Company, part of the trust, has filed suit in the United States District Court against the Colorado Fuel and Iron Company for alleged infringement of a patent on a wire fence machine, which it has been using for some time. An accounting and division of profits are asked, besides an injunction.

Duluth. Aug. 18.

Minnesota mines will this year probably be raised in tax rate to about $60,000,000, an advance of 58 per cent. This is the result of conferences between the governor, as a member of the State board of equalization, and officers of the Oliver Iron Mining Company, acting for themselves and most of the mine operators of

the district. Those operators who never pay their fair share of taxes will probably object to the valuation, but most of them doubtless will accept the situation with equanimity, as it is not so bad, after all. The valuation is not excessive, and the rate is low.

The operations of the Oliver Iron Mining Company on the western Mesabi near the town of Coleraine, are proceeding with all speed. Eleven steam shovels are to operate at Bovey this season, and with the advent of the railway, whose tracks are now completed and in use, the utmost activity prevails all along that part of the Mesabi. Ore-washing plans have been perfected, and the Oliver Company's works are about ready for installation. It is proposed to wash these ores by a combination of trommels and jigs and the cost will be slight. The plans of the company for this part of the Mesabi are far more elaborate and comprehensive than has ever been told, and foundations for the most important mining operation now under consideration anywhere on the continent will soon have all been laid. Explorations in the same vicinity are progressing well. The Oliver Company is developing its Walker purchase as fast as possible, and is showing large tonnages there. Other companies are also getting results. Among these, Pickands, Mather & Co. have recently run into good ore on explorations in 56-23. They have been fortunate in finding an ore that will not require washing, though they have not yet driven enough holes to prove that their high grade deposits is of large extent.

On the Cuyuna range, west of Duluth, some 40 drills are working at this time. G. H. Crosby and associates have more of these than any other one interest, but the Oliver Company is drilling with several machines, the Northern Pacific road, and Messrs Hartley with some individuals are at work.

The Oliver Iron Mining Company is working steadily in Canada, north of the Minnesota boundary, around Atikokan and Steep Rock lakes. Several shafts have been sunk during the summer, and several of the locations where work has been in progress have been abandoned. But it is reported that more recent operations, near Atikokan lake, have been favorable, and that a considerable tonnage of good ore is being exposed there. The company has been conducting a reconnaissance further north and may send men up to look over the field carefully, though it is unlikely that any elaborate exploration will be conducted there in the near future.

Operations on the Canadian works of the Atikokan Iron Company, erecting a furnace and accessories at Port Arthur, have been seriously delayed by the lack of material and men. Equipment that should have arrived at the works in the spring has not been delivered, and it has been found almost impossible to get expert men erectors. The plant, which was to have been making iron by this time, will not be blown in before Jan. 1, next. Nothing is going on at the company's mine on the Atikokan range, and nothing will begin there till the Canadian Northern road has its branch line in and machinery has been delivered. But there will probably be no delay at the mines, which can be soon made ready.

The Midland Steel Company, of Pittsburg, which two weeks ago secured the well-known Section 30, Vermillion range, is examining Mesabi properties and is understood to have secured options on some tracts there. Explorations will be carried on and the company hopes to secure a considerable tonnage of Mesabi ores. Its efforts in this direction will be watched with considerable interest, for it is the general opinion that any new considerable tonnage of desirable Mesabi ores is exceedingly difficult to secure, except upon onerous terms. Section 30, which the Midland Steel Company has taken up on a royalty of 75c. a ton and an agreement to pay a large sum as bonus, has been developed by the Shagawa Iron Company by a shaft and some short drifts. The whole work is something less than 800 ft., and a considerable amount of ore has been cut, some of it high in iron. But so far it is not safe to call the property a mine, for much of what is called ore is said to be mixed and development is not sufficient to determine it.

Platteville, Wis. Aug. 18.

The installation of pumping and hoisting machinery at the Russel has been completed. The new style of power pumphead that was put in by the Galena Iron Works Company is working well, and shows a saving of over 33 1/3 per cent. in fuel over the old style steam head. The showing of lead increases daily and it is expected that development work will have progressed far enough by spring to warrant the erection of a large concentrating plant.

A set of double 18-in. lift pumps of the Galena pattern, with the capacity of 2000 gal. per minute, has been ordered for the Black Jack mine, it having been found that the steam pumps were inadequate. The entire pumping equipment of the mine has been turned over to the Galena Iron Works Engineers.

Word has been received that a new mine, the Spring Green, has been discovered about 25 miles north of the Dodgeville camp, where formerly it was thought to be barren. Arrangements are being made to equip the mine with pumps large enough to cope with the water.

W. A. Jones, of Mineral Point, who has charge of the New Jersey Zinc Company's interests in this field, is the authority for the news that the Clark mine at Highland camp will be equipped with a complete concentrating mill, operated by gasolene power.

The Williams Brothers mine at Dodgeville camp will be equipped with an electrical power plant in the near future. C. W. McIlhon, of Mineral Point, has charge of the company's affairs.

Thomas Aide, superintendent of the Kennedy, reports the discovery of a new lode of ore in the East hill similar to the developed portion of what is called the West hill. The owners contemplate the erection of two new 100-ton concentrating plants.

The Lilly is located in the back yard of one of the finest residences in the city of Mineral Point. The development work so far has shown a rich run of ore. There is now piled up in the dumps an estimated tonnage that warrants the installation of a crushing plant. Owing to the location it will be necessary to convey the washdirt to the creek by wagon, to be washed there by hand jigs.

One of the biggest strikes since the Beacon Light was discovered was made last week at the Search Light, when 10 feet of jack and sulphur was penetrated after the drill-hole was shot.

Plans are on foot for the addition of several concentrating tables to take care of the slimes at the Empire mine. The ore recently drilled into on the Ivey property, belonging to the same company, continues to improve. If sufficient ore is found to warrant, it is proposed to move the present power equipment from the Empire to the Ivey land and install at the former place a large central electrical power plant.

Calumet, Mich. Aug. 20.

Estimates made earlier in the year as to the probable production of the Michigan copper district in 1906 must necessarily be revised because of the accidents, labor disturbances, scarcity of miners and other factors which have interfered with regular operations at some of the most important producers. It was expected earlier in the season that this year's output of Michigan copper would reach 250,000,000 lb. refined, but the strikes at the Quincy, Michigan, and Adventure mines, the fire in the Tamarack, the subsidence of the ground in the Atlantic and other unfavorable and unforeseen circumstances have materially reduced the production of the Lake Superior properties, and it is doubtful from a view of the situation as it now exists if the output this year will show half the gain that was expected some time ago.

At the Tamarack, production has been curtailed since January, when a fire broke out underground in No. 2 shaft. Nos. 1, 2 and 5 shafts were cut off from production for a few months, but No. 5 has since resumed shipping rock to the stamp mills. No. 3, which is not connected with the other shafts, has operated continuously, not being effected by the fire, and ships an average of 1000 tons of rock daily. Until Nos. 1 and 2 shafts are fit to start shipping rock, the Tamarack will be un-

able to make more than three-fifths of its normal production.

There is no likelihood of the Atlantic becoming a producer again this year. The decision of the management to abandon the old mine workings upon the Ashbed formation, which has been a source of production for the past 30 years, means that the Atlantic will not be a producing factor again for some time to come. As the mine normally produced 4,000,000 to 5,500,000 lb. of copper per annum, this means a considerable loss.

Work at the Ontonagon county mines, where operations have been curtailed because of strikes, is rapidly assuming normal proportions. The Michigan resumed operations in a week, and rock shipments are going forward to the mill at the rate of 450 tons daily. The miners are doing their own tramming, and the company refuses to reëngage any of the strikers who figured in the recent riot. New men are being secured as rapidly as possible, and as the trammers are secured the miners are relieved of doing their own tramming. There is a large quantity of rock broken underground in the Michigan, and the mine is prepared to maintain its present rate of production for some time, without the necessity of blasting loose new ground.

At the Adventure Consolidated mine the strike was confined exclusively to part of the trammers, but because they quit and the rock could not be trammed by the small force remaining, it was necessary for the mine to suspend operations. The entire working force will be reorganized and some of the miners put to tramming. The management expects to have the mine producing its usual amount of copper by the end of the week. At the Victoria mine the production was affected only in a small degree. When some of the men struck for higher wages and found that their demands would not be granted, they returned to work. The stamp mill is treating 250 tons of rock daily and last month's product was 70 tons of refined copper. The rock is said to be yielding 1 per cent. mineral, exclusive of mass and barrel copper.

Sudbury, Ont. Aug. 15.

A. McCharles, whose death was noticed in the JOURNAL last week, was considered an authority on the nickel question and contributed freely to the press on such matters. For many years he has been in conflict with the legislative assembly, of Ontario, against the mining policy of this province and his views were frequently quoted on the floor of the legislature. He discovered the North Star nickel mine and sold it for a goodly sum to the present owners. Though financially in good circumstances he lived an extremely modest life, denying himself many ordinary comforts. Several years ago he purchased a town site on the Vermillion river, which was called Nickel City, and this he retained till his death.

New blast furnaces are under construction at the Sault Ste. Marie for the purpose of enabling the company to use a greater proportion of the Canadian ore. At present but little of the ore from the company's mine at Michipicoten is used, the most of that used being brought from Minnesota. The rail mill at Sault Ste. Marie is still working day and night with a heavy output. A new record for the twenty-four hours is claimed by the company, as on Wednesday of last week a few tons over 1000 were accomplished.

Victoria, B. C. Aug. 16.

Among the progress reports received by the director of the Geological Survey of Canada from the members of the Survey staff in the field are the following from British Columbia:

O. E. LeRoy has finished the examination of the coast section from the international boundary to Burrard inlet and is now continuing it in Howe Sound. He has traced out the rocks on the coast containing economic minerals and will carefully study the more important areas of Howe Sound. Chas. Camsell, in the Similkameen, has finished mapping the Princeton coal basin, and has left that neighborhood to examine the Roche river, Kennedy mountain, and Copper mountain camps along the South Sililkameen, from the international boundary northward. R. W. Brock reports good progress in the detailed study and mapping of Rossland camp, and sees no difficulty in completing the work before the end of the season. He has sent for analysis specimens of sands from Little Sheep creek, which, he suspects, contain platinum along with a considerable amount of gold. No word has been received from W. W. Leach, in the Bulkley valley, in the northern interior plateau of British Columbia, nor from D. B. Dowling, who is tracing northward the anthracite coal area on the eastern slopes of the Rocky mountains. From Dawson, in Yukon Territory, though, word has come that the work of estimating the volume and value of the gold-bearing bench gravels is well under way.

Johannesburg. July 16.

There has been considerable discussion over the law which prohibits a mine from carrying on underground operations, other than development work, unless two shafts or outlets are provided. Several mines are feeling this law very much. Take the case of the Cinderella Deep, which recently struck the reef at 4000 ft. with excellent results. As this deep-level mine has only one shaft it will be impossible to get into full working order until another shaft is put down, or a connection with an outcrop company is made. After much discussion on the subject, the Government has added the following to the law:

"Provided that, notwithstanding anything in this regulation contained, the winning of ore from such mines having but one shaft or outlet shall be unlawful unless it be authorized by the Government mining engineer in writing, for purposes of testing the ground opened up; and such authorization shall only be given upon the observance of the conditions following: (1) That the ore extracted shall not exceed five thousand tons. (2) That the number of persons employed underground at any one time shall not exceed 250. (3) That such work shall be carried on underground between the hours of sunrise and sunset only. (4) Such further conditions as in the opinion of the Government mining engineer shall tend to insure the safety of the persons employed in the mine."

The Government is quite right in refusing to alter the law regarding two shafts or outlets, and the concessions are quite enough. In a mine like the Cinderella Deep there would probably be 1500 men employed underground when the mine is in full swing. One shudders to think of the result should their only shaft have a serious accident and the men be buried alive for a month.

After this refusal of the Government to alter the law, the outcrop companies will no doubt push on their incline shafts, so that a deep-level company with only one shaft might get another outlet to the surface.

The gold output for June breaks all previous records, and were it not for the cloud of depression hanging over the place, there might have been a celebration of the announcement of the record output, which was worth well over £2,000,000. The increase is principally due to a new producer, the Cason, a mine of the East Rand group, which made the splendid declaration of 13,130 oz. If the Cason can keep up to its first record, it will rank as one of the premier companies of the Rand. The Cason returns show that this mine made the excellent recovery of $9.50 per ton crushed.

The returns from the Chamber of Mines Labor Importation Agency show that on June 30 there were 52,329 coolies on the Rand available for the mines. During the month 2087 arrived from China. The Imperial Government has definitely declared that recruiting will be stopped after Nov. 30. The mines will use up all their licenses for recruiting coolies in China before that time.

The stock market is lifeless. One or two diamond propositions have come forward recently, and livened things up a bit, but the gold shares seem to be almost entirely neglected. It looks as if the depression in the share market would continue. The depreciation of South African shares during the past year is simply appalling.

General Mining News.

ARIZONA.

GRAHAM COUNTY.

Arizona Copper Company, Ltd.—This company reports that the production of its mines at Clifton, for the month of July, was 984 short tons of copper. Conditions were very unfavorable throughout the month.

CALIFORNIA.

BUTTE COUNTY.

Gold Bar Dredging Company — This Company, composed of Los Angeles men, will shortly begin dredging operations on the property, on Butte creek, at Diamondville. Instead of the usual endless chain and bucket dredge, they will use a steam shovel to lift the gravel, subsequently washing in the usual way.

CALAVERAS COUNTY.

Banner Group—L. C. Morgan, of Spokane, Washington, has bonded for himself and others of that city this group of three claims at Angels. Development work will commence at once.

DEL NORTE COUNTY.

Doctor Rock—The copper ledge with this name is at the head of Blue creek on the Siskiyou range, and is a very wide one. The property is being examined with a view to purchase. Thus far little development has been done.

EL DORADO COUNTY.

Cambrian—Dr. Davis, of this copper mine, at Lotus, has been for some time experimenting with the ammonia leach-process for obtaining the value from the ore. Thus far other methods of working the ore have been too expensive for profit.

INYO COUNTY.

Desert Hound—This mine was discovered not long since by E. M. Wilkens and Burt Sides, of Fresno, and lies in the Funeral range, Death valley region. Eastern men have now purchased it for $30,000, cash, and 75,000 shares of the company to be incorporated to work it. Burt Sides will be the superintendent. The men who discovered the mine were ranchers with no knowledge of prospecting or mining.

Tungsten Ore—The Minnehaha Mining and Milling Company, M. D. Hamilton, president, 218 South Broadway, Los Angeles, has an order for 10 tons of tungstic acid per month from its mine at Indian creek, 22 miles from Caliente. The property was first worked as a silver-lead proposition, but the scheelite ledge, paralleling the other, proved of more value. A depth of 200 ft. has been reached, and the ore is found to carry about 50 per cent. tungstic acid.

Zenda—At this mine, Amalie district, L. W. Morgan, superintendent, the improvements at the mill have been completed.

Greenback Copper Mining Company—This mine at Woody is under lease to Joseph Werringer, who has 1500 tons of high-grade copper ore ready to be hauled to Delano, the shipping point. It is expected to mine 30 tons of shipping ore per day.

Greenwater—This place is situated near the Nevada line on Furnace creek, in the Funeral range. Several camps have been established. The Furnace Creek Copper Company has a shaft down over 150 ft., and has a 6-ft. ledge that gives copper. Heinze and W. A. Clark both have groups there and have started development work and have made a very satisfactory showing. The Greenwater & Death Valley Copper Company (said to be Schwab's company) has organized, and has purchased 18 claims; it will continue the shaft (now 100 ft.) down to 500 ft. and crosscut, and will be well equipped for rapid work.

The Borax Smith Railroad will come within 12 miles of this camp and will be completed to this point within 60 days, it is claimed. Smith also promises to run in a branch line to the camp from his borax works at Lila C.

Furnace Creek Gold and Copper Company—This is a company just being formed by San Francisco and Goldfield men. It has acquired the Red Dog group, consisting of five claims. These claims probably show the largest croppings in the district; a vein showing ore 20 ft. wide adjoins the ground of the company.

Saratoga—This group, consisting of five claims, owned by the Nevada-California Prospecting Company, adjoins the Red Dog group. It has a fine surface showing, and development work will begin in September.

LASSEN COUNTY.

Washoe-Lassen — This company is opening seven claims in the new mining district, 45 miles southeast of Amadee. The veins are about 2 ft. wide, but they are sacking for shipment the rich ore mined, there being no reduction works. Lower-grade ore is still on the dumps. There is a good wagon road from the mines to Amadee.

NEVADA COUNTY.

Gold Flat — Although the Cornish pumps had been submerged for years, when started up the other day they worked all right, and the 340-ft. shaft will soon be drained. Work of development will begin as soon as the mine is dry. Joseph Weissbein is manager.

Conlin — At this mine, Grass Valley, high-grade ore is being extracted, although the ledge is narrow. Two adjoining claims have been purchased by this company.

California—This mine, at Deadman's Flat, is to be pumped out and re-opened, for which purpose the old machinery is being put in order.

Murchie Mining—At this mine, drifting is being mainly prosecuted on the eighth level, where the ledge fills the drift and the foot-wall has not yet been reached. The average of the ore taken out for a month past has paid close to $8 a ton for the sulphurets alone, besides giving excellent returns in free gold.

Ethel—At this mine, Washington, the five additional stamps of the mill are now working, the milling capacity being doubled.

PLUMAS COUNTY.

Plumas-Eureka—At this mine, Johnsville, formerly a famous producer, 15 men are now at work. A tramway is to be installed to send ore down the mountainside to the mill.

Nevada Development Company — This recently incorporated company is to work mining ground on the middle fork of Feather river below Nelson point.

SAN BERNARDINO COUNTY.

California Gold and Copper Mining Company—Sixteen men are now at work on this property, 18 miles from Needles, where a body of good ore is reported on the 200 level.

SHASTA COUNTY.

King — Some of the claims in the McCloud region, owned by Wm. King, have been placed under bond to men who will develop them.

Mammoth Smelting Company — This company declines to treat ore for flux which contains less than 80 per cent. silica. Most of the ores in that vicinity run about 60 per cent.

Shasta Consolidated Copper — This company has obtained by purchase the Royal group of claims in Whiskeytown district.

Moline—A. Hurst and N. W. Keith, of Redding, have started a crew of men sinking on this mine near Iron mountain. As soon as a station is cut drifts will be run.

Copper—John Vance has uncovered good copper ore between Moline and Spring creeks, on a line between the Iron mountain and Bakalala deposits.

SISKIYOU COUNTY.

Golden Eagle—In this mine, on Indian Creek, A. C. Brokaw, has made a rich strike. The mine has been under bond for $120,000, but the bond was forfeited, since which time the rich ore has been uncovered.

Salmon River—Numbers of prospectors are invading the Salmon River country, with an outfit of the '49 type—burros, pick, pans and shovels—in search of ledges at the Snowden district, on Salmon river and its tributaries.

Classic Hill—T. S. Fuller, of San Francisco, president of this Company near Happy Camp, reports good pay having been struck.

California Consolidated — This Company, operating the Gold Ball at Rollin, has recently struck the ledge it has been running for in the lower level of the mine.

Sheba—At this mine, eight miles from Fort Jones, a strike of rich ore has been made. N. W. Graves is manager.

TRINITY COUNTY.

Golden Jubilee — At this mine, near Carrville, Wm. Chapman, superintendent, work has been started on a cyanide plant.

TUOLUMNE COUNTY.

Santa Ysabel — At this mine, near Sonora, E. C. Loftus, manager, enough capital has been raised to again commence sinking the main shaft in the hope of reaching good ore, 1000 ft. below the bottom of the present shaft.

Jessie Gold—F. W. Hockey, manager of this property, has settled up all indebtedness and resumed work.

Longfellow—At this mine, Big Oak Flat, F. W. Partington, superintendent, the mill and compressor are now operated by electrical power.

COLORADO.

LAKE COUNTY—LEADVILLE.

Crecentia—This is the first property that has ever opened a shoot of ore west of the Iron hill fault and south of California gulch. For the last 20 years, A. F. Wuensch, the well-known mining expert, has been trying to locate this ore-shoot, and after repeated attempts and failures has proved that his theory was correct, and has added another paying mine to the district. From the 620-ft. level a drift was started from the bottom of the shaft and driven into the Zulu King ground through the Cambrian quartzite, then through the Iron hill fault into the blue lime. Driving in this formation for a little distance northeast a fine-grained white porphyry dike 10 ft. wide was gone through, then into the blue and into the ore channel. The orebody is from 12 to 15 ft. wide and, so far, 15 ft. high, and alongside of the walls in character is iron-manganese ore carrying from 10 to 20 oz. silver per ton, with some lead; the center of the orebody is hard, and sand carbonate of lead, chlorides and galena liberally sprinkled all through it and runs high in silver. Mr. Wuensch is of the opinion that the ore channel is one of the several ore-shoots comprising the Louisville-Silver Cord shoot of Iron hill. The trend of the new ore-shoot is northeast and southwest, and it is the general opinion that it will carry up to the porphyry contact, the distance of which is unknown. Work is also being carried on in another part of the territory to locate the Rubie ore-shoot that yielded largely in the past in the Columbia, Robert Emmet and Mary Murphy claims. This orebody in a short distance between the Dome and Iron hill fault produced $500,000. So far the Crecentia has shipped 750 tons from the new strike.

Big English Gulch—The owners of the Eagles, where the recent strike was made, came to the conclusion that the most practical way to open the orebody was to go lower down the hill and start a shaft; this was done, and the shaft is now down 75 ft. and has 125 ft. still to go, before the ore is caught. A great deal of prospecting is being carried on in the gulch and is extending to the head where it runs into the Mosquito range.

Sugar Loaf—This district is shipping quite a lot of ore at present, and some of it is high grade. From the Bartlett tunnel 150 tons monthly are being shipped that will net the lessee $200 per ton. Five sets of lessees are at work on the Dinero, and all are shipping ore that will run $100 per ton; the ore is similar in character to that being shipped from the Bartlett. A tunnel is being driven on the Gunnison which has 50 ft. still to go before the ore-shoot is cut; this will catch the vein 265 ft. beneath the lower workings. From the upper workings the property has yielded largely.

East Tennessee—The Jennie June has been sold to Pittsburg people for $20,000, and the first installment of $5000 has been paid. The new owners will erect a shaft-house and install a plant of machinery; when this is completed sinking will be started and the shaft sent down to the parting quartzite, where it is believed that the blanket formation will be found. The Golden Gate people are sinking and still have the ore in the shaft.

Progressive—A fair body of lead-carbonate ore has been opened in one of the lower levels, and the lessees expect from now on to be able to ship from two to three carloads per week. The ore was caught northeast of the old Finn smelter.

Rothschild Tunnel—This adit, in Montezuma district, is now in 5000 ft. and still being driven ahead. Two veins have been cut that show up well in high-grade ruby silver; the veins were cut at a 1400 ft. perpendicular depth.

Belle of Granite—This property, in the Granite district, resumed work during the week. The high-grade ore will be sacked and shipped to the smelter; the large body of low-grade free-milling ore will be sent to the mill. There is quite a quantity of this ore blocked out in the upper workings.

Rock Dome—Lessees started a new shaft on this property, sunk it 280 ft., cut a station and made connections with the old workings, from which they are taking some excellent ore.

SUMMIT COUNTY.

The placer mining operations at Breckenridge are giving excellent returns. The water supply is still fairly adequate, and the intermittent rains are of great aid.

Colorado Consolidated—This company has been sluicing in the vicinity of the old Gold Pan pit, in the Blue river, and the first clean-up for this season was so far above all expectations, that additional sluicing will be carried on as long as the season permits.

Mecca—This company's ground sluice is fast approaching the old Oro Grande pit, and the work is now on bed rock.

Summit Banner—The work of sluicing in Iowa Gluch continues to disclose boulders of gold-bearing quartzite

Reliance—In cleaning up at the Reliance dredge, lately, a large piece of zinc ore was found carrying free gold.

Old Union — This company has now completed its connection by upraise from the main tunnel to the old workings, and for 85 ft. of it there is a strong vein of concentrating ore over 5 ft. wide.

Gold Dust—The Gold Dust Puzzle combination is now being worked. The electric pump and hoist have been installed; and are driven by power from the Colorado Consolidated works at Breckenridge, two miles distant.

TELLER COUNTY—CRIPPLE CREEK.

Drainage Tunnel—The majority of the mining companies and mine owners of the Cripple Creek district seem to be in favor of the intermediate tunnel proposition, and that plan will probably be carried through. The Cripple Creek Drainage Tunnel Company will be incorporated and as soon as that is done, the contracts with the various mine-owners will be signed. The capitalization will be 1,000,000 shares of $1, and the directors will be Frank G. Peck, Sherwood Aldrich, S. S. Bernard, John T. Milliken, C. C. Hamlin, A. E. Carlton, F. F. Castello, F. J. Campbell and W. J. Chinn, all prominent men of the district.

IDAHO.

ADA COUNTY.

Big Giant—At this company's mine, nine miles east of Boise, a great deal of development work has been done this season, and there is now a considerable quantity of ore blocked out. The company is now considering the question of putting in a mill.

INDIAN TERRITORY.

CHOCTAW NATION.

McAlester Coal Mining Company—This company is sinking a new slope on the lower Hartshorne coal about a mile east of Buck and expects to have track connection with the Chicago, Rock Island & Pacific and the Missouri, Kansas & Texas railways. The coal they are now working in is 3 ft. 6 in. thick and pitching 18 deg.; a drill hole about 2000 ft. ahead of the slope shows 4 ft. of coal at 500 ft. deep. The company expects to reach a capacity of 350 to 400 tons per day. S. P. Allen, of Buck, I. T., is manager.

Indian Coal and Mining Company—This

company is considering opening a shaft mine on the lower Hartshorne coal between Buck and Pocahontas. If sunk, it will be connected with the Chicago, Rock Island & Pacific Railway. J. S. Nichols, of Pocahontas, I. T., is manager.

Rock Island Coal Company—The proposed deal for the purchase of this company's mines by the Great Western Coal and Coke Company is off, the Rock Island company having decided to keep its mines. This company is equipping mine No. 3 at Gowen with electric haulage. Carl Scholz, Chicago, is president; Edward H. Coxe, Hartshorne, I. T., superintendent.

Missouri, Kansas & Texas—The recent floods in the Southwest entirely filled this company's mines 9 and 10 at Colgate, the shafts being filled to the top. At this time it is not thought they will attempt to pump them out, as the bottom is soft and the roof poor, and the mines will be closed. In all, 680 men were employed, and the capacity of the two mines was about 1400 tons. S. J. Tonkin, Parsons, Kan., is manager.

INDIANA.

VIGO COUNTY.

Fox Coal Mining Company—This company has filed articles of incorporation with the Secretary of State. The capital stock is $10,000. The company will maintain principal offices in Riley and will open coal mines in Vigo county. John F. Fox, George J. Fox, and John Fox are the directors.

East Hulman Coal Mining Company—This company, with principal offices in Terre Haute, has incorporated to do a general coal-mining business in this State. The company will open shafts in Vigo county. John A. Greenwood, Herman A. Schmidt and C. M. Hennington, directors.

WARRICK COUNTY.

Warrick county now ranks sixth among the coal-producing counties of Indiana. In its area of nearly 250,000 acres only a small fraction is without coal, and less than one-tenth has been developed. Six mines are operating on an extensive scale, furnishing labor to a large number of men and producing a daily output of more than 1000 tons. The Ohio river affords a cheap transportation and a ready market.

PARKE COUNTY.

L. R. Disher is preparing to open a new coal mine on Roaring creek, north of Annapolis. Mr. Disher has secured 31 acres of coal land on which to establish his mines.

MICHIGAN.

HOUGHTON COUNTY—COPPER.

Calumet & Hecla—This company has declared a dividend, of $20 per share, payable Sept. 21. The last dividend, three months ago, was $15. The total paid in 1905 was $50 per share.

At the annual meeting in Boston, Aug. 15, the following directors were reëlected by a vote of 68,377 shares: Alexander Agassiz, Newport, R. I.; Francis L. Higginson, Boston; Francis W. Hunnewell, Wellesley; Quincy A. Shaw, Jr., Boston; James MacNaughton, Calumet, Mich.

In addition to his remarks in the annual report, President Agassiz said: "Considerable work has been done on the Nonesuch property. The mine has been unwatered and a mill is to be erected very shortly. We will run five small stamps and test the ground which has been opened. We have opened considerable ground on the Manitou property and the developments which have been made there are fair. On the Superior there has been practically no change since the last report. We have continued our explorations on this property owing to the extension of the option which we have secured. Later on, we hope to be able to give out more definite information. With the Nonesuch we have also acquired option on a considerable acreage of land which surrounds it, so that if we find the Nonesuch is a valuable property, we will control considerable territory around it. We have an option on this property for three years."

By vote of the stockholders the action of the directors with relation to the new properties, which the company has formed during the year for the acquirement of additional territory, was ratified. The stockholders also voted to authorize the directors to sell such woodland and timberland as they deemed expedient, from time to time

IRON—MENOMINEE RANGE.

Shipments of stocked ore from the underground mines of the Menominee range is still in progress, and some of them will not have all of the winter's production loaded out before September. There are piles at the Crystal Falls mine, the Lamont, Dunn, Bristol, Hemlock, and Mansfield. Explorations in that region are progressing very fast. Longyear at Hodge have seven drills there, all of them large and for deep work, and have some difficulty in getting men for their work. At Mastodon and Tobin, explorations by drill are also under way.

Traders—Traders mine, at Iron Mountain, Menominee range, is working very heavily this year. Several large concerns, including the Republic Iron and Steel Company are interested in the property, and are making it give up ore as never before. The mine is a big open pit, with shafts sunk for hoisting ores, as in the milling pits of the Mesabi range; indeed the systems of mining are identical. The ore is low grade, highly silicious, low in phosphorus and moisture, running about 41 per cent. iron, and about 37 to 40 per cent. in silica, making it exceptionally good for certain mixtures and available as a flux for low-silicon ores from other ranges. Its orebodies are quite large and mining is carried on at low cost, without timbering and with little powder, while the product per man is large. A new shaft is to be sunk and the mine prepared for a still larger product another year.

LOUISIANA.

CALCASIEU PARISH.

Jennings—Salt water and the fact that no new permanent wells were brought in were responsible for a decline of 150,000 bbl. in July production. August prospects are brighter, for Riley & Hood brought in a gusher on Aug. 7, which had an initial flow of 12,000 bbl. and then settled down to 7000 bbl. Compressed air is being extensively used and wells are being equipped daily. The recent advance in prices will stimulate development. Under a law enacted by the last Legislature, and effective July 27, all pipe-lines for oil or gas are declared common carriers and under control of the State Railway Commission.

MISSOURI.

JASPER COUNTY.

Anderson—A good run of zinc ore was encountered recently by this company, operating on the Granby Mining & Smelting Company's land at Chitwood, in a new shaft being sunk. The ore was struck at a shallower depth than the drill indicated when the lease was being drilled some time ago, but the shaft will be sunk to the lower run of ore before any attempt is made to develop the upper run.

Ideal—This company, composed of A. D. Hatten and T. F. Coyne, of Webb City, and a number of LeRoy, N. Y., parties, operating on the Rex Mining and Smelting Company's land east of Joplin will this week produce its first ore. This is a new property, and the mill has been started. The ore is a high grade, assaying between 63 and 65 per cent. The company expects to be able to clean up 150 tons of ore weekly.

Criterion—This company is planning the erection of a modern 400-ton mill on its lease at Porto Rico, to be operated by electricity.

Center Creek—The Center Creek Mining Company, of Webb City, has transfered part of its holdings, the Morgan 40-acre tract, lying north and west of Carterville, to S. Y. Ramage, of Oil City, Penn., for a consideration of $110,000 cash. This lease, as stated above, consists of 40 acres and includes a 200-ton concentrating plant and two shafts, one for hoisting and the other for air. Several months ago the company decided to test this land by drilling and put down 40 holes, in all of which was struck the same run of ore at about the 140-ft. level, a sheet formation averaging from 10 to 14 ft. in thickness. The company proceeded at once to

sink two shafts and erect a modern mill, and for the past few months has been cleaning up about 90 tons of zinc ore per week. This is the largest price ever paid in this district for a 40-acre lease with only two shafts and one mill thereon. Mr. Ramage has a 60-day option on the fee for about the same amount as paid for the lease.

Princess—This company, operating on the Ware land northwest of Webb City, has commenced the erection of a 300-ton concentrating plant, at a cost of about $15,000. This is a new property, and the ground is being opened up in shape to supply plenty of dirt when the mill is ready. It is a sheet formation and will be worked from the 200-ft. level.

MONTANA.

SILVERBOW COUNTY.

Boston & Montana—Work incident to the re-equipment of the main shaft on the Moutain View mine, will be finished soon, after which the ore output of the property will be increased from 900 to 1500 tons a day. The new engine will work to a depth of 3,500 ft. The old method of handling ore has been completely changed, skips and pockets having taken the place of cars, and 900 ft. of the shaft has been re-timbered. Sinking will soon be begun and continued to an indefinite depth. With the resumption of hoisting there, the shaft on the West Colusa will go into the hands of timbermen and be made new from top to bottom, 1900 ft. The ore of this mine will be hoisted through the Mountain View and new shaft on the Leonard while work is in progress.

Anaconda—A good-sized streak of high-grade copper glance has been cut on the 2,400-ft. level of the High Ore mine. It is in one of the large veins. The company is sacking it and shipping it separately.

Butte & Superior—This company is negotiating for the purchase of the Deadwood, Damarat, Laura and Enterprise claims, which are close to its other holdings. The deal for the former has been closed, but the others are still open. The four are to be bought with money derived from the sale of stock. Their acquisition will give the company a group of good claims, provided the others, on which bonds have been secured, are taken over. No payment has been made on the Niagara, the purchase price of which is $360,000. One payment has been made on some of the others, and another of 10 per cent. is due Dec. 1. The bonds run a year.

North Butte—The daily output of ore established by North Butte six weeks ago, has not been increased. It is between 1000 and 1100 tons a day. The company expects to begin raising 300 or 400 tons more, inside of two weeks. Its new air compressor has been started and is working perfectly.

Reins Copper—A large pump capable of raising 800 gal. of water a minute has been placed on the 1200 station. Mining was resumed today in the east and south openings of the lower workings. Butte officers of the company claim that the prospects for developing orebodies on the 1200 are good. Ore is coming from the winze on the 800.

Butte & Bacorn—Some copper ore has been struck in the bottom of the Colleen Bawn shaft. It assays 1½ per cent., but there is not enough to create further interest than the fact that the vein is a copper maker. Greater depth is required to dertermine the value of this vein. The two other shafts of the property are sinking rapidly and the material coming from the Calumet is mineralized.

Lewisohn General Development—This company has cut a 5-ft. vein of silicate copper ore in a tunnel on the Montgomery, to which claim it is confining operations. This vein is supposed to be the one that traverses the Bertha, Bullwhacker and Maggie on the north.

NEW YORK.

ST. LAWRENCE COUNTY.

Benson Mine—It is stated that plans are being made to reopen this mine, which has been idle for several years. There is a larger body of magnetite, averaging 35 per cent. iron, most of which can be brought by concentration up to 65 per cent. iron, with low phosphorus.

NEVADA.

ESMERALDA COUNTY—TULE.

Considerable work has been done in the Tule district, during the past few months, with satisfactory showing.

Alice Gold—This company has a shaft down 160 ft., and has struck a good strong ledge with values in gold and silver running high. The shaft reached the water level and is now waiting for a pump.

Big Bird Gold—This company has a shaft down 140 ft.; ledge 12 to 30 in. wide, and in shipping ore.

Nevada Tule Gold—This company has a shaft down 130 ft.; the ledge is strong, and values found.

Goldfield-Comstock—This company has driven a tunnel some 250 ft., and cut one 6-ft. ledge that assays gold. It is driving ahead for a larger vein that crops on the surface.

Red Dog—This company is down 70 ft., following a ledge from 10 to 24 in. wide, with good values.

Esmeralda Placer—This company is not working, but has ordered a dredge, and expects to operate this fall.

Summit Placer—The placer ground over the summit at the head of the cañon, in what used to be known as the Walker diggings, is making a good showing, and some of the men are taking out an ounce a day.

Mollie Malone—This company has a shaft 20 ft. deep and has cross-cut a ledge 15 or 20 ft. wide with an open cut, giving values of from $7 to $12 per ton, gold. In running a tunnel to tap the ledge at a lower level they encountered a blind parallel ledge carrying about 10 per cent. lead and about 50 oz. in silver, and not more than 50 ft. from the gold ledge. They are about to sink a 100-ft. shaft between the two ledges and then cut in both directions.

ESMERALDA COUNTY—GOLDFIELD.

There is much development work being done here. The pay-roll is much larger than ever before, some 2000 men being employed. Much machinery is coming in and being installed. The interest at present seems to be centered in or about the Mohawk ground.

Frances-Mohawk Lease — Here they have made the latest strike and have good shipping ore. They have cross-cut some 45 ft., and are still in ore on the 220-ft. level. The company is well equipped with the necessary machinery, drills, etc., to be a large producer.

Mohawk Leasing and Development Company—This company, on the Truett lease, is down 230 ft. Values are increasing.

MacKenzie-Mohawk Lease No. 1—The cross-cut from the 150-ft. level is still in low-grade ore; when the wall is reached they expect to encounter a continuation of the rich ore found on the Oddie lease. They are using machine drills, and the cages will be running next week. A pump is also to be installed and equipment for larger production.

Combination Fraction — The Loftus-Davis Company has secured part of this claim, and Oddie gets adjoining ground. Work will be pushed as fast as men and machinery will permit. This ground lies between the Mohawk, Combination, Florence and Jumbo claims, and is considered exceptionally good.

St. Ives—The company, as well as the leasers, are at work, producing shipping ore and making regular shipments.

Nevada-Goldfield Reduction Company—This company expects to start up soon with a capacity of 500 tons per day. They are equipped with everything necessary to successfully treat all ore, concentrates, precipitates, etc., and have a picked staff. They promise to handle ores at a fair figure, and many mines can dispose of their low-grade ores that have been unprofitable to ship. About 1500 tons of ore is the usual weekly shipment made from Goldfield.

NYE COUNTY.

Ore Shipments—Shipments of ore over the Tonopah Railroad for the week ending Aug. 9 were: Tonopah, 2322 tons; Goldfield, 1588; Lone Mountain, 30; total 3940 tons. The shipments from Tonopah in detail were: Tonopah Company, 1134; Tonopah Extension, 620; Belmont, 255;

Midway, 97; Montana-Tonopah, 89; McNamara, 90; West End, 37; total, 2322 tons.

PENNSYLVANIA.

ANTHRACITE COAL.

Miners' Wages—President T. D. Nichols, of District No. 1, of the United Mine Workers, has been notified by Commissioner Neil that, in accordance with the provisions of the sliding scale, the miners of the anthracite region are entitled to an increase of 2 per cent. on their earnings for July. This is based on the average price secured for coal at tidewater during the month of July.

Breaker Location—Judge E. C. Newcomb, of the common pleas court of Lackawanna county, has handed down a decision in the case brought by Mine Inspector H. D. Johnson against Elliot, McClure & Co., in which he decided that a breaker built over the mouth of a shaft, prior to the act of 1891, which forbids the erection of a breaker or other inflammable material within 200 ft. of any mine opening, can be replaced without violating the law. Elliot, McClure & Co. owned the Sibley breaker in Old Forge, which was recently destroyed by fire. The old breaker had been built over the mouth of the shaft, and the firm immediately began to replace it. Mine Inspector Johnson began equity action in court to restrain it from doing so, contending it was a violation of the law of 1891.

Lehigh Valley—This company has ordered 1500 new coal cars. The county commissioners of Columbia county have largely increased the valuation of the company's property. This is said to be in retaliation for the company's action in robbing the pillars in the old colliery at Centralia, regardless of damage to surface property.

Jermyn—The strike at the Jermyn mines in Old Forge, in which 1000 men and boys were affected, has been brought to a close through the intercession of a prominent local attorney, who arranged a conference between General Manager Joseph J. Jermyn and a committee representing the men. As a result of the conference one of the collieries will be started almost immediately, and the other in a short time. The settlement is regarded as a victory for the men as, hereafter, grievances will be decided by the Conciliation Board. Heretofore Mr. Jermyn has refused to have anything to do with the board. The strike was begun Feb. 14, last, and was caused by a reduction in the price for rock-work. A short time later the Sibley breaker, the only other one at Old Forge, was destroyed by fire and the borough was in danger of being commercially ruined. The business men and members of the Conciliation Board endeavored to have Mr. Jermyn agree to a settlement, but all efforts failed. According to the agreement, No. 1 colliery will be started immediately, and all the old hands will be given their former places without discrimination. No. 2 colliery, where the trouble first commenced, will not be started until the management is ready, and it is agreed that at that time a conference will be held on the adjustment of wages.

BITUMINOUS COAL.

The city of Connellsville, the center of the coke region, last week celebrated its centennial by various parades and festivities. One of the notable features was an immense double arch of coke erected by the H. C. Frick Coal and Coke Co., at Main and Pittsburg streets. The base of the arch rested upon immense blocks of coal, and the whole studded with electric lights, presenting a brilliant appearance.

Buffalo, Rochester & Pittsburg Railroad—The report of this company for the fiscal year ended June 30, last, shows the coal tonnage carried for the year as follows:

	1905.	1906.	Changes.
Anthracite.....	91,962	73,413	D. 18,549
Bituminous.....	6,234,260	5,204,437	D. 1,029,823
Coke.....	700,259	706,857	I. 6,598
Total.....	7,026,481	5,984,707	D. 1,041,774

Concerning its subsidiary coal company, the report says: "The operation of the Rochester & Pittsburg Coal and Iron Company for the fiscal year, after deducting from net earnings $120,000 principal of bonds paid off, resulted in a profit of $96,043. Its business was seriously affected by the strike of its miners, extending from April 1 to July 23, 1906. The company charged against the surplus standing to the credit of profit and loss account $146,941, being the entire amount expended during the year for new construction, mining machinery and equipment."

SOUTH DAKOTA.

LAWRENCE COUNTY.

Hidden Fortune—A special meeting of the stockholders has been called, to be held in Lead, Sept. 4, to consider the matter of consolidating with the Columbus Gold Mining Company. The plan includes the transfer of all Hidden Fortune property to the Columbus for $230,000 of the latter's bonds and 2,000,000 shares of its stock. The directors also contemplate giving a bonus of 2 shares of Columbus stock with each dollar of the bonds.

Reliance—The tanks for the new mill on Annie creek have arrived and will be installed as soon as possible. The rolls have arrived and the steel roofing and siding are being put in place.

Gilt-Edge Maid—Owing to the breaking of the crusher, the mill is closed temporarily. A small pumping plant is being built and a pipe-line run across the gulch to furnish an increased amount of water.

Golden Queen—The shaft has reached a depth of 160 ft., and has gone through about 60 ft. of good grade ore. Sinking will be continued to the 200-ft. level, when cross-cutting will be begun.

Golden Crest—This company is putting in a complete electric system. An electric hoist and air-compressor capable of lifting 500 ft., and Leyner water drills, have been ordered. Ore is being mined from the 125-ft. level, and development work on the 200 shows a shoot of satisfactory grade from 6 to 16 ft. in width.

Esmeralda—This mine, with its mill, is being worked on a lease, and the first clean-up showed that the ore averaged better than $9 a ton. Some good ore has been encountered recently in the upper workings.

PENNINGTON COUNTY.

Holy Terror-Egyptian — These companies, together with the Keystone, have been consolidated, and the Tykoon mill on the Egyptian is being operated on ore from that property.

Montana Mines Company—A test shipment of ore from this property will be made in about six weeks. A tunnel has been run in a distance of 500 ft., and has cut through several orebodies.

Spotted Tail Camp—A strike of sylvanite ore, assaying high, was made by A. D. Ticknor while doing assessment work.

UTAH.

JUAB COUNTY.

Gemini—The management has contracted the output of its mines to the United States Smelting Refining and Mining Company for a term of years. Present shipments are about 1500 tons monthly, the ore assaying about 12 per cent. lead and 40 oz. silver.

Tintic Ore Shipments—Last week shipments amounted to 143 carloads, or about 6000 tons, the shippers and amounts being: Eureka Hill, 16; Centennial Eureka, 36; Yankee Consolidated, 4; Beck Tunnel Consolidated, 5; May Day, 5; Eagle & Blue Bell, 3; Uncle Sam Consolidated, 4; Bullion Beck, 6; Gemini, 6; Scranton, 4; Dragon Iron, 13; Swansea, 3; South Swansea, 1; Joe Bowers, 1; Carisa, 7; Mammoth, 10; Ajax, 2; Victoria, 9; Grand Central, 9; Godiva (concentrate), 2 cars.

Colorado—This company has begun the development of its property, adjoining the Beck Tunnel Consolidated, again.

Mammoth—This company marketed 98 tons of ore from the 1200 and 1300 levels, which netted $12,144 the controls showing 6.7 oz. in gold, and 2.7 oz. in silver.

PIUTE COUNTY.

Sevier Consolidated—This company is operating its mill at about one-third its capacity, pending the completion of a new raise in the mine which will facilitate the handling of ore.

SALT LAKE COUNTY.

Shawmut—This Bingham company is operating a force of 30 men. An 18-in. fissure has been cut in No. 2 adit, showing 7 per cent. copper and some in silver.

Ohio Copper Company—The management has commenced sinking a new shaft at its Bingham mine and is carrying on an exploratory campaign in other parts of the property.

City Rocks—This company is operating at Alta. W. S. Cleaves, of Houghton, Mich., is president; J. P. Edwards, of the same place, vice-president, R. P. Edwards, of Salt Lake, general manager.

SUMMIT COUNTY.

Ontario—A small hoist has been installed at shaft No. 1, which has been out of commission for several years. Work in the drain tunnel is progressing, and the avenue should be cleared before very long.

Park City Ore Shipments—Five mines marketed 2012 tons last week, the contributors being: Silver King, 620; Daly-West, 475; Daly-Judge (crude), 527; Daly-Judge (concentrate), 129; Kearns-Keith, 50; Little Bell, 211 tons.

Steamboat—This company, operating in the Snake Creek district, is working 25 men. A new adit is being driven to develop its property. Jesse Knight, of Provo, is president of the company.

TOOELE COUNTY.

Honerine—Two shifts are now working in the mill; three are developing and breaking ore in the mine.

Stockton—Some interesting developments are taking place in the east drift on the 1000-ft. level.

UTAH COUNTY.

Daniels—This company has been organized to operate five lode claims in American Fork mining district. J. P. Mageath is president; J. M. Hamilton, vice-president; Frank Danies, manager, all of Salt Lake City.

WASHINGTON COUNTY.

Utah & Eastern Copper Company—A force of 150 men is employed at the mine and smelter, near Shem City. The three-compartment shaft, which intersects with the main tunnel, is down 1075 ft. The company has not been marketing copper matte for several months, on account of the condition of the roads, which were destroyed by washouts. These have been repaired, and a traction engine is being used to haul freight to and from the nearest railroad point.

WEST VIRGINIA.

RALEIGH COUNTY.

Raleigh Coal and Coke Company—This company is actively at work opening its mines near Beckley. The stope is being driven, and work is well advanced on the tipple, and the 600 ft. of track required to connect with the railroad. The company expects to begin shipping coal by November.

Foreign Mining News.

CANADA.

BRITISH COLUMBIA—BOUNDARY.

Granby Consolidated—This company is sinking a three-compartment shaft at its mines at Phoenix. Sinking is in progress from the surface and at the 200- and 400-ft. levels. For the time sinking will not be continued below the 500-ft. level. The shaft is inclined at 60 deg. Over it will be erected a 90-ft. head frame. A double conical-drum hoisting engine, operated by a 250-h.p. type S Canadian Westinghouse variable-speed induction motor, 2000 volts and equal to sinking to a depth of 2000 ft., will hoist ore in two five-ton skips in balance, the skips automatically dumping into two 400-ton receiving bins. About one-quarter of the work of sinking the new shaft is completed and the hoist machinery is on the ground. Other main workings of the mines for getting out ore are two shafts and three double-tracked tunnels.

A Jenckes-Farrel crusher, of the Blake type, having a jaw opening of 42x36 in. and a capacity of 150 tons per hour crushed to a 6-in. cube, has been ordered. This will crush the ore from the above mentioned bins. It will be conveyed thence to the railway bins for shipment to the smelter. This will make the third of these large crushers in use at these mines.

It is intended during the ensuing fall to install on the 400-ft. level of these mines an electric haulage system to deliver ore from the various workings on this level to the new shaft. Machinery and cars for this system are being designed and plans are in course of development. Ore is being obtained at all levels of the mines, from the big open quarries down to the 500-ft. level, inclusive. The ore smelted at the company's works during the financial year ended June 30, last, was about 800,000 tons, this including a small quantity of custom ore, but the great bulk was from its own mines. From this some 20,000,000 lb. of copper were produced. The company employs about 450 men at its mines and 350 at its smelting works. Labor is reported to be scarce in the Boundary, and mines and smelters are all experiencing difficulty in keeping up full forces of men.

BRITISH COLUMBIA—NELSON DIVISION.

Arlington—The following is a general statement of the operations at the Arlington mine, Erie, Ymir district, owned by the Hastings (British Columbia) Exploration Syndicate of London, England, during the financial year ended May 31, 1906: Tons of ore shipped, 1232; net smelter returns, $52,735; cost of mining and shipping, including development, $38,508; gross profit, $14,227, being 27.11 per cent. of returns; average value of ore per ton net $42.81, gross $51.12; number of cars of ore mined, 1370, and of waste 12,327 cars; total development work done, 1470 ft. In one level there is 4 ft. of ore in the face of the drive. The mine is managed by Leslie Hill, consulting mining engineer, Nelson.

BRITISH COLUMBIA—EAST KOOTENAY.

Crow's Nest Pass—The tonnage of coal produced at this company's three collieries, during seven months of this year to July 31, is as follows: Creek Coal, 319,136 tons; Michel, 211, 050; Carbonado, 22,578; total, 552,764 tons. No coal has been mined at Carbonado since March last. Shipments of coke totaled 149,629 tons, of which 54,214 tons were made at the Fernie ovens and 75,415 tons at Michel. The average monthly production of coal this year has been 78,966 tons as compared with 69,271 tons, which latter was the average for the whole of 1905. These figures show a gain of 9695 tons. On the other hand, there has been a slight falling off in the average monthly shipments of coke, which were 21,475 tons in 1905 against 21,376 tons per month this year.

NOVA SCOTIA.

Dominion Coal Company—Production has fallen off greatly of late on account of the difficulty of obtaining an adequate supply of labor. Large numbers of miners are leaving Sydney and neighborhood for the West, and the company has, in consequence, been unable to fill contracts. President James Ross has made many changes in the official staff and re-organized the departments.

ONTARIO.

British American Development Company—The plant at this company's pyrite mine near Queensboro, in Hastings county, has been destroyed by fire. The loss and insurance are not reported.

S. O. Armstrong, colonization agent of the Canadian Pacific Railway, who lately returned from a visit to the Net Lake district near Temagami, about 20 miles south from Cobalt, reports the discovery of deposits containing molybdenum and gold in the Huronian formation. A number of claims have been taken up and are being worked.

Baden-Powell—The shaft of this mine in the Eagle Lake district is down 140 ft., the vein at the level reached being 4 ft. wide, though only 8 or 10 in. at the top. Some rich samples have been taken at the lower level, showing no falling off in values. The working force will be increased and development actively pushed.

Montreal-Cobalt—Gold has been struck at this mine in the Cobalt area. The manager states that the vein will yield $1000 per ton.

Tilbury Oilfield—A new well in the Tilbury oilfield is reported as producing 135 per day. There are now over 30 oil and gas producing wells in this field and many more being drilled. The average depth of wells is 1400 ft. in this district.

QUEBEC.

About 20 companies are now prospecting in the newly opened Chibogamoo district, and about 700 square miles of territory have been covered by prospectors' licenses. It is stated that all of these companies have discovered some mineral of value. A fine quality of chrome iron ore has been found at Lac Doré. Now Mr. Prevost of the Quebec government will shortly visit the region or send a representative, with a view to arranging for the building of a railroad to open up the mines.

AFRICA.

RHODESIA.

The gold production for the month of July is reported at 48,485 oz. bullion, which is 821 oz. more than in June, and 13,390 oz. more than in July, 1905. For the seven months ending July 31, the total was 310,862 oz. bullion, against 233,382 oz. in 1905; an increase of 77,480 oz. The bullion reported this year was equal to 276,667 oz. fine gold, or $5,718,707 in value.

ASIA.

INDIA—MYSORE.

Kolar District—The production of gold in July is reported at 47,247 oz. bullion, being 569 oz. less than in June, and 4947 oz. less than in July, 1905. For the seven months ending July 31 the total was 339,203 oz. bullion, against 365,511 oz. in 1905; a decrease of 26,308 oz., or 7.2 per cent. The bullion reported this year was equal to 305,283 oz. fine gold, or $6,310,200 in value.

NEW ZEALAND.

The Mines Department reports the exports of gold and silver for the five months ending May 31 as below, in ounces:

	1905.	1906.	Changes.
Gold	205,088	216,488	I. 11,400
Silver	457,249	622,398	I. 165,149

The May exports this year were 42,203 oz. gold and 190,085 oz. silver. The gold bullion reported for the five months this year was equal to 206,128 oz. fine gold, or $4,260,657 in value.

Coal Trade Review.

NEW YORK, Aug. 22.

The western coal trade continues steady, local demands well supplied. In fact, there is complaint at some points of oversupply and weakening prices. In the Lake trade the usual rush is coming on.

In the East, trade is good for the season, but there is general complaint about shortage of cars. Mines are unable to ship enough to fill contracts for this reason. Such complaints are common in the fall, but this is rather early in the season for trouble of this sort.

There is some re-arrangement of ownership of mines going on in a quiet way, the effects of which will not be evident until later.

COAL TRAFFIC NOTES.

The coal and coke traffic originating on all the lines of the Pennsylvania Railroad east of Pittsburg and Erie, for the year to Aug. 11, was as follows, in short tons:

	1905.	1906.	Changes.
Anthracite	2,837,839	2,615,769	D. 222,070
Bituminous	17,324,725	19,044,965	I. 1,720,240
Coke	6,690,161	7,691,970	I. 1,001,809
Total	26,852,725	29,352,704	I. 2,499,979

Shipments of Broad Top coal over the Huntingdon & Broad Top Railroad for the week ending Aug. 18 were 15,337 tons; for the year to Aug. 18 they were 479,315 tons.

Coastwise shipments of coal by water from the leading ports are given by the Bureau of Statistics of the Department of Commerce and Labor as below, for the six months ending June 30:

	Anthracite.	Bituminous.	Total.
New York	6,947,716	4,841,919	11,789,635
Philadelphia	873 681	1,823,981	2,697,662
Baltimore	102,877	1,599,386	1,702,263
Newport News	.....	1,508,418	1,508,418
Norfolk	.....	1,178,306	1,178,306
Total	7,924,274	10,952,010	18,876,284

There was a decrease of 905,255 tons in anthracite, and an increase of 1,227,230 tons in bituminous; leaving a net gain over last year of 321,975 tons, or 1.2 per cent.

In the month of June there were 620,566 tons of coal bunkered, or loaded on steamships for their use, at Atlantic, Gulf and Pacific ports. Of this quantity 121,508 tons was on vessels bound for domestic ports, and 499,058 tons on vessels for foreign ports.

Coal tonnage reported by the Ohio Coal Traffic Association for the six months ending June 30 was as follows, in short tons:

	1905.	1906.
Hocking Valley	1,536,278	1,720,112
Toledo & Ohio Central	671,541	702,038
Baltimore & Ohio	994,733	757,711
Wheeling & Lake Erie	1,248,093	1,014,319
Cleveland, Lorain & Wheeling	955,008	928,756
Zanesville & Western	366,209	466,675
Toledo Division, Penna. Co.	886,517	1,133,792
Lake Erie, Alliance & Wh'ling.	348,722	303,829
Marietta, Col. & Cleve	.....	3,999
Total, net tons	7,007,101	7,030,331

The total shows an increase of 17,230 tons, or 0.2 per cent., notwithstanding the strike.

New York. Aug. 22.

ANTHRACITE.

The hard-coal market shows no immediate prospect of improvement, and nothing will affect it until the arrival of cold weather. Consumers generally are well supplied and local dealers find no profit in buying coal at only 10c. off, and storing it until winter. A little demand may be seen just before the end of this month, when prices revert to their winter level, but it will be of no importance.

The fine coals show wide variation in demand. Lehigh and similar coals are in overwhelming supply and, although the large companies sustain their prices, some of the smaller producers are probably selling their fine coal for what they can get, and several have curtailed their washery outputs. On the other hand, the demand for fine sizes in the free-burning coals is really stronger than for the prepared sizes, and unrestrained tonnages move off without a fluctuation in price.

Prices on the domestic sizes remain at $4.65 for broken and $4.90 for egg, stove and chestnut. Steam sizes remain at their regular prices: $3 for pea, $2.25@2.50 for buckwheat, $1.45@1.50 for rice and $1.30 @1.35 for barley; f.o.b. New York harbor shipping points.

BITUMINOUS.

Short car supply is the one disturbing element of the Atlantic seaboard soft-coal trade, and no reasonable explanation can be discovered for its occurrence at just this time. Demand for tidewater shipment is beginning to strengthen, so that, for the first time this season, the want of cars is becoming acute.

The far East is singularly dilatory about laying in its winter supply; this is the more reprehensible in view of the present cheapness of coal and water transportation rates, and the moral certainty of a still keener future stringency in all-rail transport. The Sound is taking on some coal, but not enough to harass the New York, New Haven & Hartford terminal facilities. Trade in New York harbor is upset by not being able to get cars; regular producers are having to buy in the open market in order to keep up to their contracts.

All-rail trade is exceedingly active, and, for some reason, is not so much hampered by the railroads as is tidewater business. Demand for vessels in the coastwise trade is not heavy and small boats can be had from Philadelphia to Boston for 50c. and to Newburyport and Saco for 60c. and towages. Large boats command 10c. higher.

Birmingham. Aug. 20.

The calling off of the strike of the union men at mines of furnace companies, which took effect this week in a quiet way, may result in a number of men getting work in the mines of these companies. The delegates and officers of the convention held during the past week by the union coal miners have remained very quiet as to the business that was transacted, but when the time came for distributing rations and clothing to the striking men, notice was given that the last distribution was the one then on, which meant that the strike was practically called off. There are about 2000 men who will probable seek employment in open-shop mines. Many of these are negroes, but the fact that they remained out on strike for more than two years, shows that they followed their white brethren firmly.

Coke is more plentiful in Alabama and brings a good price. Such companies as can sell the product are finding no trouble in disposing of same.

Chicago. Aug. 20.

The coal trade continues dull but dealers see signs of hope for the lessening of demurrage evils by restriction of shipments. According to the railroads, cars for coal-carrying purposes are becoming scarce, and this condition, while a hardship on certain branches of the trade, will be hailed with delight by dealers in Illinois and Indiana coals. It will mean, if the restriction is no greater than in previous years, smaller shipments of these coals to the local market and yet sufficient receipts to supply the normal needs of the trade, at prices affording a fair margin of profit. To the shippers of eastern coals to this market, the benefit will not be so apparent, but a slight shortage of cars will probably do them little harm.

Already demurrage coal is not so plentiful as it has been for several weeks. No advance in prices of consequence, however, is looked for until September. Fine coals continue favorites in the steam market. Illinois and Indiana screenings sell for $1.40@1.60, run-of-mine for $1.50@1.85 and lump and egg for $2@2.40. Country trade continues better than city trade, the sales of coal for threshing purposes being especially good.

Eastern coals are firm and in somewhat scant supply, the shortage being ascribed to lack of cars. Smokeless, Hocking and Youghiogheny are all affected, and bring circular prices almost without exception. Anthracite is not yet in demand, the trade being almost lifeless, and though Sept. 1 will see the end of the monthly discounts, there is no probability of a lively trade until cool weather comes.

Cleveland. Aug. 21.

There is such a rush of coal to the lakes at present that the car supply has been shortened for the general trade and prices in consequence have strengthened. Practically every terminal between the mines and the lake ports is congested with coal, consigned to the lake docks. The boat supply on the lakes has not been sufficient to keep the coal moving. Fears are expressed that the lake movement this year will not meet contract requirements. The coal shipper by lake will have some difficulty in getting the required amount of tonnage, unless there is an advance in the wild rates. The effect on the coal trade has been to put up the price of mine-run steam coal. This is now selling at $1 at the mines. Pennsylvania slack is worth 75c. at mines, and Ohio is selling at about 80c. at mines.

The demand for coke is exceptionally strong. There is little for spot shipment and the material on contracts would bring higher prices were the ovens disposed to make contracts, which they do not seem to be. The best grades of 72-hour foundry coke are selling at $3.25@3.50 at the oven for quick shipment and furnace coke is selling at $2.75 at the oven.

Pittsburg. Aug. 2.

Coal—Fully 40 per cent. of the mines in the Pittsburg district that ship by rail are idle, owing to a shortage of railroad cars. It is not likely that the situation will be improved this week and prices are firm on a basis of $1.10@1.15 a ton for mine-run coal at the mine. The rivers are navigable again today and several small tows were sent out, but the aggregate tonnage of coal will not exceed 2,000,000 bush. The second rise within two weeks was unexpected and shippers were not prepared to take advantage of it. An unusually large number of tows of empty craft that were tied up at points between Pittsburg and Wheeling when the waters receded were able to get in on the latest rise.

Connellsville Coke—Production in the Connellsville region increased last week, but there was a decline in shipments due to a scarcity of railroad cars. Prices are firmer; furnace coke is quoted at $2.70@2.80, and foundry at $3@3.10, although several large interests have declined to quote less than $3.25 for foundry. The production for the week, according to the *Courier*, amounted to 278,843 tons and the shipments to 13,956 cars distributed as follows: To Pittsburg, 4612 cars; to points west of Pittsburg, 7390 cars; to points east of Connellsville, 1954 cars. The production in the Lower Connellsville field amounted to 106,020 tons.

Foreign Coal Trade.

Aug. 22.

The net receipts of the Revenue Department, from the duty of 1s. per ton on coal exported from Great Britain, were £2,183,973 for the year ended March 31, 1906; an increase of £131,199 over the previous year.

Exports of coal from Great Britain, with coal sent abroad for the use of steamships engaged in foreign trade, were as follows, for the seven months ended March 31, in long tons:

	1905.	1906.	Changes.
Coal	27,025,633	31,575,624	I. 4,549,991
Coke	381,214	416,947	I. 35,733
Briquets	657,747	835,261	I. 177,514
Total exports	28 064,594	32,827,832	I. 4,763,238
Steamer coal	9,995,256	10,676,372	I. 681,116
Total	38,059,850	43,504,204	I. 5,444,354

The total increase in fuel consumed outside of the United Kingdom was 14.3 per cent. Included in the exports are the following shipments to the United States:

	1905.	1906.	Changes.
Atlantic ports	25,741	21,479	D. 4 262
Pacific ports	72,415	28,002	D. 44,413
Total	98,156	49.481	D. 48,675

The more important exports were to France, 5,410,965 tons; Italy, 4,884,399; Germany, 4,168,593; Sweden, 1,921,747; Spain, 1,597,614; Egypt, 1,458,152; Argentina, 1,399,431; Denmark, 1,375,361; Holland, 1,039,001 tons.

Iron Trade Review.

New York, Aug. 22.

Little is to be added to last week's report. One of the features of the market has been the pressure to buy foundry iron, which has sent up prices in the local markets. Apparently many foundries have been holding back, either uncertain as to business or hoping for lower prices. As is usually the case, they are now rushing to buy, and bidding up prices. Belated buyers will have to pay for their delay, in the shape of premiums to secure the deliveries they need. Apparently there is little speculative iron in the hands of middlemen.

In finished material there is no change. Demand continues large; the mills are all busy, and some of them have trouble in keeping up with their contracts. Engagements in most lines now run well into 1907, and there is a certainty of abundant work for months to come.

Lake shipments of iron ore are still below expectations. The chief cause is the shortage of labor at the mines. Few of the mines have all the men they need, and some are seriously embarrassed by this trouble.

There is talk of importing pig iron and steel billets. No large shipments are yet reported from the other side. Imports, however, have been larger than last year.

Birmingham. Aug. 20.

With No. 2 foundry iron quoted at $15, Southern furnace companies who have iron to sell for delivery this year are finding no trouble in selling it. There is not much iron to be had. The make is yet under the normal condition, though one furnace, No. 5 at Ensley, Tennessee Coal, Iron and Railroad Company, will be making iron before the middle of this week. This furnace, however, will produce basic iron for steel making. The Alabama Consolidated Coal and Iron Company is again manufacturing foundry iron at Gadsden, but has orders on hand which will require some weeks yet to fill. No. 5 furnace started up at Ensley is the most modern furnace in the Birmingham district. It is announced that the other furnaces at Ensley will be rebuilt one at a time.

Machine shops and foundries report business improving right along.

Chicago. Aug. 20.

Though sales of pig iron have not been so great, in aggregate volume, in the last week as in the previous week, they have been large. Buying continues for the first and second quarters of 1907, with a lively market for spot lots to fill the needs of melters. These spot lots command premiums of 50c. to $1 over quotations for future supplies and are not numerous enough to supply the demand. On sales for regular delivery Northern brings $19@19.25 and Southern $14.75@15 Birmingham ($18.65@18.90 Chicago) for No. 2 foundry. Many of the Southern furnaces are out of the market for 1906 deliveries.

The demand for iron and steel products continues good with the exception of steel rails. Structural steel is especially in good demand. Coke is somewhat scarce, Connellsville bringing $5.65, and other cokes 25@50c. less.

Cleveland. Aug. 21.

Iron Ore—Influenced by heavy buying of iron for 1907 delivery, some of the furnaces have tried to buy ore for next year. They have found shippers unwilling to sell or even to quote at present. Sales are expected soon and it is believed 1907 ore prices will be higher, especially for high-grade ores, which are scarce. Despatch to boats is not good now, due to the shortage of cars in the lake trade and consequently August's ore movement will probably not equal July's.

Pig Iron—The past week has seen a tremendous buying movement in No. 2 foundry for delivery through the first half of next year. Foundry interests are fearing a duplication of the present shortage. Advanced sales are being made at $18 for No. 2 in the Valleys. Spot iron is sold at $19.25 at the furnace. Southern No. 2 is strong, with the furnaces asking $15 Birmingham. There is a strong demand also for bessemer and basic. The market is barren of iron for prompt shipment.

Finished Material—The market hears that eight more boats are to be built in the near future. This calls for a strong demand for structural and plates, when the market is already congested. The Bar Iron Association has reaffirmed the old price of 1.50c. Pittsburg which the mills ignore and sell at 1.60c. Sheets are strong, with deliveries impossible inside 10 weeks. Billets are still scarce, with some interests bidding strongly for the forging quality and paying $34@35 Cleveland.

New York. Aug. 22.

Pig Iron—The market is strong and active, and the pressure for iron continues. Business now runs well into 1907, and prices are strong. Iron for short deliveries is scarce, and belated buyers have to pay premiums to get metal when they need it. In some cases they are buying from second hands.

Current quotations for pig iron are, for New York or parallel delivery:

Northern:	
No. 1 X foundry	$19.50@$20
No. 2 X foundry	19@19.50
No. 2 plain	18.75@19
Forge pig	17@17.75
Southern:	
No. 1 foundry	19@19.50
No. 2 foundry	18.50@19
No. 3 foundry	17.75@18.25
No. 4 foundry	17.25@17.75
No. 1 soft	19@19.50
No. 2 soft	18.50@19
Gray forge	16.75@17.50
Basic pig:	
Northern	18@18.50
Virginia	18.60@19.10
Alabama	

City or local deliveries are not included in prices, which are for large lots, on dock or cars.

Cast Iron Pipe—The demand is heavy for the season. All the foundries are full, and no early deliveries can be had. Prices are $31 @ 32 per ton for 6-in. pipe; but premiums are offered for early deliveries.

Bars—Trade has been active and prices have hardened. Some business has been taken on at 1.69c., but most is done at 1.745c., tidewater, for iron bars. Steel bars are still 1.645c., tidewater, but an advance is expected. Store trade is good at 2¼c. delivered.

Plates—Business has been moderate locally; material is scarce. Tank-plates are 1.745 @ 1.845c., according to width; flange and boiler, 1.845 @ 1.945c.; fire-box, 2.25c.

Structural Material—Most of the heavy local contracts have been let, and business is less pressing. Prices continue nominally for beams, 1.845 @ 1.895, according to size; angles and channels, 1.845c. for large lots, tidewater. Jobbers ask 2.40 @ 2.50c. for material out of stock.

Steel Rails—Prices unchanged for heavy sections, $28 at mill. Trolley rails are again called for.

Old Material—Demand is good and dealers ask more. Heavy steel melting scrap is in demand. No. 1 railroad wrought brings $18.50 @ 19; No. 1 yard wrought, $16 @ 17; while $15 @ 15.50 is taken for machinery cast. Prices are on cars, Jersey City or other terminal delivery.

Philadelphia. Aug. 22.

The tension in the pig-iron market does not concern a good many of our larger consumers, who have secured large supplies for forward delivery, but it is giving a good deal of concern to quite a number of smaller buyers who have not made provision for more than immediate wants. The tone of the market is very strong, and iron is advancing. There are more large consumers now placing orders for next year's delivery than at any time in the past. Some of our buyers are arranging for Southern iron, and yet they are paying prices which they regard as unnecessarily high. There is no immediate prospect for any change in the situation. Quotations may be given at 19.50@20 for No. L X foundry; $19@19.50 for No. 2 X; $18.75 for No. 2 plain; $17.50 for gray forge; $18 for basic; $20.50 for malleable; and $25 asked for low phosphorus.

Steel Billets—Steel billets are being bought up wherever there is a manufacturer who is willing to do business. There are quite a number of buyers in line, and all of them want more than they will get. Quotations are given at $29.50@30.

Merchant Bar—The bar mills throughout the State are all pretty well employed, considering the hot weather, but with the approach of cooler weather there will be a little larger production.

Sheets—Our sheet mills are gathering an exceptionally large midsummer business.

Pipes and Tubes—Both pipes and tubes are in good demand. Heavy shipments are coming from the mills, and the consumption, especially of tubes, appears to be gaining in volume month by month.

Merchant Steel—The indications in this section are that there will be an exceptionally large consumption of steel. There is no change in quotations.

Plates—A heavy business in plate is being done by our mills, and concessions are not to be thought of, especially among the smaller buyers.

Structural Material—The past week has been rather quiet, so far as large orders are concerned, but the smaller buyers have been making up for lost time, and their orders are flowing in. The mill people are endeavoring to accommodate their little trade and are not taking advantage of the situation to mark up prices, though premium prices are frequently obtained for very urgent deliveries.

Steel Rails—The week has been somewhat quiet as to steel rails.

Scrap—Scrap is strong; prices have been advanced about 25c. per ton all round.

Pittsburg. Aug. 21.

The iron and steel markets continue remarkably strong, the feature of the week being the heavy inquiries for pig iron for next year. Steel is scarce; it is almost impossible to obtain billets at any price and fully $1 a ton above prices quoted a week ago has been offered. The prices of sheet-bars on monthly contracts were adjusted yesterday by ordering an advance of $1 a ton and the price for sheet-bars and tin-bars for September will be $30 a ton. La Belle Iron Works is quoting $32 a ton for sheet-bars for immediate delivery. No change has been made in finished products, as the mills are unable to take on any more business in some lines for this year's delivery. The advance in the price of sheet-bars will undoubtedly put up the prices of sheets and tin-plate within a week, and wire prices are expected to be advanced shortly. Some bar makers are endeavoring to advance prices, but the leading interest will not sanction any increase at this time. Sales of structural material have been light during the past two weeks, the principal reason being that it is almost impossible to get deliveries. Specifications on old contracts are heavy, and the same may be said of plates. The changing of the Ohio works of the Carnegie Steel Company from rails to sheet-bars has enabled the American Sheet and Tin Plate Company to start a number of additional mills and the 20-mill tin plant at South Sharon, Pa., which has been running one-half of its capacity, went on in full yesterday. Independent sheet and tin-plate concerns are having difficulty in getting steel and many are away behind in

deliveries. But few are being operated to capacity, while the American company is running nearly 90 per cent. of its mills.

The Carnegie Steel Company booked 25,000 tons of steel rails during the week, all for delivery in 1907, and it is understood that the company will be forced to carry over some of this year's business into next year. There has been an increased demand for light rails and the company today advanced prices $1 a ton. The new prices are as follows: 8 lb., $37; 10 lb., $35; 12 lb., $34; 16 to 20 lb., $31@32; 25 to 45 lb., $30@31.

Pig Iron—When some deals now pending are closed, the sales of pig iron for next year's delivery will reach 200,000 tons. The Bessemer Pig Iron Association held a meeting in Cleveland on Saturday and decided not to act on the inquiry from the Republic Iron and Steel Company for iron for the first half. It is understood the Republic company wanted 15,000 tons a month for the first six months and is willing to pay $17.75. The association has sold its entire production, it is reported, for the first quarter, and will hold what iron it may have available for the second quarter for a higher price. There are a number of rumors concerning the Republic's inquiry and among them is a report that the tonnage desired was offered by a large independent interest at $18.25, which it is now believed will be the minimum price for first half bessemer iron. The Youngstown Sheet and Tube Company has closed with the association for 70,000 tons for the first half and the Cambria Steel Company has bought 90,000 tons for equal deliveries of 15,000 tons a month. The price paid by the Cambria is said to be higher than the $17.75 rate paid by the Youngstown company and by the Jones & Laughlin Steel Company for the 30,000 tons for the first quarter, mentioned last week. The leading independent interest during the week sold 15,000 tons of bessemer iron for the fourth quarter and the first quarter of next year at $18.25, Valley furnaces, and some odd lots at $18.50. The Lackawanna Steel Company came into the market for 20,000 tons of basic iron and got a quotation of $18, Valley furnace, which was accepted, but for some reason the deal has not been closed. The iron wanted is for delivery in the first quarter and this is taken as an indication that basic iron will rule at a minimum rate of $18. Foundry iron continues strong and it is almost impossible to get any for delivery in this quarter, $18, and $18.25, Valley furnace, being quoted for No. 2 grade. The Westinghouse Electric and Manufacturing Company is in the market for 16,000 tons of foundry iron for the first half, 9000 tons for the Cleveland plant and 7000 tons for the Allegheny works. The demand for gray forge is not particularly strong and quotations this week range from $17.60 to $17.85, Pittsburg. Southern No. 2 foundry is quoted here on a basis of $14.75@15, Birmingham, the freight to the Pittsburg district being $4.60 a ton.

Steel—Billets continue scarce and bessemer billets are quoted nominally at $28 and open-hearth at $29. Sheet-bars have been advanced to $30. Merchant steel bars remain at 1.50c., although one interest is quoting 1.60c. Plates are firm at 1.60c.

Sheets—Specifications are coming in freely and a great deal of new business is offered. It is believed prices will be advanced next week. Black sheets are quoted at 2.50c. and galvanized at 3.55c. for No. 28 gage.

Ferro-manganese—There is but little change in the market. Several carload lots were sold today for October delivery at $85, but for immediate shipment $87.50@90 a ton is quoted.

Cartagena, Spain. Aug. 4.

Iron and Manganiferous Ores—Messrs. Barrington & Holt report that shipments for two weeks were two cargoes, 8400 tons manganiferous ore, and one cargo, 2500 tons dry ore, to Great Britain. There is no change, except that tonnage is scarce and freight rates higher.

For iron ores quotations are: Ordinary 50 per cent. ore, 8s. 9d.@9s. per ton; special low phosphorus, 9s. 3d.; specular ore, 58 per cent. iron, 12s. 6d.; S. P. Campanil, 10s. 6d. For manganiferous ores prices range from 12s. for No. 3 ore, 35 per cent. iron and 12 manganese, up to 14s. 3d. for No. 1 B, 25 iron and 17 manganese. No ore of No. 1 grade is offering. All prices are f.o.b. shipping port.

Iron Pyrites—Quotations for iron pyrites, 40 per cent. iron and 43 sulphur, are 10s. 8d. per ton, f.o.b. shipping port.

London. Aug. 11.

Exports of iron and steel, and of machinery, from Great Britain for the seven months ended July 31 are valued by the Board of Trade returns as follows:

	1905.	1906.	Changes.
Iron and Steel..	£17,843,803	£21,932,681	I. £4,088,878
Machinery	13,119,858	15,181,396	I. 2,061,538
New Ships.....	2,381,459	6,380,333	I. 3,998,874
Total.....	£33,345,120	£43,494,410	I. £10,149,290

The exports of mining machinery were £486,371 in 1905, and £424,894 in 1906; a decrease of £61,427. The increase in the total value of exports was 30.4 per cent. The chief items of the iron and steel exports, were, in long tons:

	1905.	1906.	Changes.
Pig iron.....	559,093	868,761	I. 309,668
Wrought iron.....	102,860	109,982	I. 7,122
Rails	320,451	287,735	D. 32,716
Plates.....	110,264	143,224	I. 32,960
Steel shapes, etc.....	124,431	169,568	I. 45,137
Sheets.....	231,091	235,505	I. 4,414
Tin-plates.....	219,686	206,874	D. 12,812
All other kinds.....	434,100	513,864	I. 79,764

The total increase in quantities was 433,237 tons, or 20.6 per cent. The exports of pig iron to the United States were 107,964 tons in 1905, and 135,958 in 1906, a decrease of 27,994 tons; of tinplates, 40,075 tons in 1905, and 29,310 in 1906, a decrease of 10,765 tons this year.

Imports of iron and steel, and of machinery, into Great Britain for the seven months are valued as follows by the returns:

	1905.	1906.	Changes.
Iron and steel...	£4,629,551	£5,384,618	I. £755,067
Machinery.....	2,824,891	3,081,543	I. 256,652
Total.....	£7,454,442	£8,466,161	I. £1,011,719

The total increase was 13.6 per cent The chief items of the iron and steel imports were, in long tons:

	1905.	1906.	Changes.
Pig iron.....	66,893	48,621	D. 18,272
Wrought iron.....	49,244	70,555	I. 21,311
Steel billets, etc.....	319,445	337,451	I. 18,006
Bars and shapes.....	29,581	37,126	I. 7,545
Structural steel.....	64,613	96 505	I. 31,892
All other kinds.....	197,445	221,595	I. 24.150

The total increase in quantity was 84,632 tons, or 11.6 per cent.

Iron Ore Imports—Imports of iron ore into Great Britain for the seven months ended July 31 are reported as below, in long tons:

	1905.	1906.	Changes.
Manganiferous ores.	151,067	207,047	I. 55,980
Iron ores	4,019,764	4,626,623	I. 606.859
Total.	4,170,831	4,833,670	I. 662,839

Of the ores imported this year 122,126 tons of manganiferous and 3,750,155 tons of iron ores came from Spain.

Chemicals.

NEW YORK, Aug. 22.

Copper Sulphate—The situation is considerably easier than in the past few weeks. The demand is brisk with the supply keeping well up. Deliveries are good but some difficulty would probably be experienced in filling a large spot order for several carloads. We quote $5.90 per 100 lb. for carload lots and $6.25 for smaller parcels, depending upon quantity, terms of shipment, etc.

Nitrate of Soda—The market is firm, and prices are unchanged. Such advices as have been received from Chile indicate that the nitrate-producing region was not affected by the great earthquake. The only damage reported was at the port of Antofogasta, which is one of the shipping ports for nitrate.

Jackson Brothers report from Valparaiso, Chile, under date of July 7, that activity has continued, with advancing prices. Quotations closed at 8s. 7d. for refined, and 8s. 2d. for 95 per cent. The export quantity has been fixed at 43,500,000 quintals for the nitrate year, and the reduction of quotas at 27½, instead of 30 per cent.

British Chemical Trade—Exports of heavy chemicals from Great Britain for the seven months ending July 31 were as follows, in cwt. of 112 lb. each:

	1905.	1906.	Changes.
Bleaching powder.....	510,930	568,890	I. 57,960
Muriate of ammonia..	50,323	66,665	I. 13,343
Soda ash	837,992	933,182	I. 95,190
Bicarbonate of soda ..	256,232	214,069	D. 42,163
Caustic soda	835,691	916,444	I. 80,753
Soda crystals.....	112,089	99,255	D. 12,834
Soda sulphate	352,647	506,763	I. 154,116
Sulphuric acid.....	46,243	54,482	I. 8,239
Copper sulphate.....	1,051,700	783,820	D. 267,880

Imports of chemicals and raw materials

were as follows, in long tons, for the seven months:

	1905.	1906.	Changes.
Nitrate of potash.....	5,339	6,861	I. 1,522
Nitrate of soda.....	62,789	71,562	I. 8,773
Phosphates	228,015	284,890	I. 56,875
Sulphur.....	12,393	10,627	I. 1,766
Pyrites	421,319	454,917	I. 33,598

Estimating sulphur contents of pyrites at the usual figure, the total imports of sulphur were 180,920 tons in 1905, and 192,594 tons in 1906; an increase this year of 11,674 tons, or 6.4 per cent.

Metal Market.

New York, Aug. 22.

Gold and Silver Exports and Imports.

At all United States Ports in July and year.

Metal.	Exports.	Imports.	Excess.
Gold:			
July 1906..	$1,303,248	$9,838,296	Imp. $8,535,048
" 1905 .	1,159,274	4 973.241	" 3,813,967
Year 1906..	32,913,962	72,376,074	" 39,462,112
" 1905..	40,990,864	21,582,694	Exp. 19,408,170
Silver:			
July 1906 ..	4,360,628	3,270,927	" 1,089,701
" 1905 ..	4,285,000	2,976,296	" 1,308,704
Year 1906 ..	37,797,855	26,947,855	" 10,840,100
" 1905 ..	29,366,266	18,149,719	" 11,216,547

These statements cover the total movement of gold and silver to and from the United States. The figures are furnished by the Bureau of Statistics of the Department of Commerce and Labor.

Gold and Silver Movement, New York.

For week ending Aug. 18 and years from Jan. 1.

Period.	Gold.		Silver.	
	Exports.	Imports.	Exports.	Imports.
Week.....	$ 63,600	$ 157,900	$1 124,385	$ 73,420
1906.....	5,940,603	48,444,963	38,254,638	1,377,030
1905..... .	37,929,843	1,027,173	20,987,569	2,383,349
1904.....	69,795,579	3,735,437	25,726,077	605,963

Imports for the week, both gold and silver, were from the West Indies and Mexico. The gold exported for the week went to South America; the silver to London.

The foreign merchandise trade of the United States for the seven months ending July 31 is valued as below by the Bureau of Statistics of the Department of Commerce and Labor:

	1905.	1906.
Exports.....	$848,899,444	$969,393,168
Imports	674,454,040	744 980,820
Excess, exports ...	$174,445,404	$224,412,348
Add excess of exports, silver....		10,850.100
Total.....		$235,262,448
Deduct excess of imports, gold..		39,462,112
Net export balance.....		$195,800.336

The gold and silver movement in detail will be found in the table at the head of this column.

The statement of the New York banks —including all the banks represented in the Clearing House—for the week ending Aug. 17, gives the following totals, comparisons being made with the corresponding week of 1906:

	1905.	1906.
Loans and discounts..	$1,146,101,500	$1,067,298,400
Deposits.....	1,188,551,300	1,053,756,000
Circulation.....	51,592,100	46,070,500
Specie	221,194,800	189,129,000
Legal tenders.....	85,298,700	81,411,500
Total reserve.....	$306,493,500	$270,540,500
Legal requirements....	297,137,825	263,439,000
Surplus reserve	$9,355,675	$7,101,500

Changes for the week this year were increases of $190,000 in specie and $16,000 in circulation; decreases of $5,175,900 in loans, $3,647,100 in legal tenders, $9,148,300 in deposits and $1,170,025 in surplus reserve.

The following table shows the specie holding, in dollars, of the leading banks of the world:

	Gold.	Silver.	Total.
New York.....	.....	.....	$189,129,000
England.....	$185,165,985	.....	185,165,985
France.....	583,317,265	$212,784,505	796,101,770
Germany.....	172,900,000	57,630,000	230,530,000
Spain.....	76,000,000	123,130,000	199,130,000
Netherlands...	27,595,000	28,640,500	56,235,500
Belgium.....	15,906,665	7,953,335	23,860,000
Italy.....	148,560,000	19,439,000	167,999,000
Russia.....	553,415,000	29,670,000	583,085,000
Austria.....	234,455,000	61,795,000	296,250,000
Sweden.....	19,390,000	.....	19,390,000

The returns of the associated banks of New York are of date Aug. 18, and the others Aug. 17. The foreign bank statements are from the *Commercial and Financial Chronicle*, of New York. The New York banks do not separate gold and silver in their reports.

Shipments of silver from London to the East are reported by Messrs. Pixley & Abell as follows for the year to Aug. 9:

	1905.	1906.	Changes.
India.....	£ 4,145,141	£ 10,964,113	I. £ 6,818,972
China.....	753,841	243,400	D. 510,441
Straits..	2,800	1,750	D. 1,050
Total.....	£ 4,901,782	£ 11,209,263	I. £ 6,307,481

Receipts for the week this year were £5500 from New Zealand and £206,956 from New York; a total of £212,456. Exports were £775 to Egypt, £155,800 to India and £29,700, in Mexican dollars, to China; £186,275 in all.

Indian exchange shows a slightly better demand, but the rate has not changed, and the Council bills offered in London were all taken at 16d. per rupee. The demand for silver for India is increasing.

The movement of gold and silver in Great Britain for the seven months ending July 31 was as follows:

Gold:	1905.	1906.
Imports	£21,972,148	£25,789,348
Exports	14,374,962	19,106,363
Excess, imports.....	£10,597,186	£ 6,682,985
Silver:		
Imports	£ 7,647,476	£11,756,632
Exports	8,249,355	12,529,404
Excess, exports.....	£ 601,879	£ 772,772

Of the silver imported this year a total of £10,262,562, or 87.3 per cent., is credited to the United States.

The movement of gold and silver in France for the five months ending May 31 is reported as follows:

Gold:	1905.	1906.
Imports.....	Fr. 296,753,000	Fr. 319,155,000
Exports.....	53,878,000	84,666,000
Excess, imports....	Fr. 242,875,000	Fr. 234 489,000
Silver:		
Imports.....	32,763,000	65,560,000
Exports.....	27,824,000	50,448,000
Excess, imports....	Fr. 4,939,000	Fr. 15,112,000

Imports of copper and nickel coins were 71,000 fr. in 1905, and 45,000 fr. in 1906. Exports were 110,000 fr. in 1905, and 119,000 fr. this year.

The silver market has continued firm with advancing tendency on buying for both China and India. The French mint is also in the market.

Prices of Foreign Coins.

	Bid.	Asked.
Mexican dollars.....	$0.51	$0.53¾
Peruvian soles and Chilean.....	0.46¾	0.49¾
Victoria sovereigns.....	4.85½	4.87½
Twenty francs.	3.86	3.89
Spanish 25 pesetas...	4.78	4.80

SILVER AND STERLING EXCHANGE.

Aug.	Sterling Exchange.	Silver. New York, Cents.	Silver. London, Pence.	Aug.	Sterling Exchange.	Silver. New York, Cents.	Silver. London, Pence.
16	4.84¾	66¼	30⅝	20	4.84½	66¾	30⅞
17	4.84¾	66¼	30 9/16	21	4.84½	66⅝	30 13/16
18	4.84½	66⅝	30 13/16	22	4.84½	66⅝	30 13/16

New York quotations are for fine silver, per ounce Troy. London prices are for sterling silver, 0.925 fine.

Other Metals.

Daily Prices of Metals in New York.

Aug.	Copper. Lake, Cts. per lb.	Copper. Electrolytic, Cts. per lb.	Copper. London, £ per ton.	Tin. Cts. per lb.	Lead. Cts. per lb.	Spelter. New York, Cts. per lb.	Spelter. St. Louis. Cts. per lb.
16	18⅝ @18¾	18 5/16 @18⅜	83 9/16	41⅜	5.75	6.02½	5.87½
17	18⅝ @18¾	18 5/16 @18⅜	83 13/16	41⅜	5.75	6.02½	5.87½
18	18⅝ @18¾	18 5/16 @18¾	....	41⅜	5.75	6.02½	5.87½
20	18⅝ @18¾	18 5/16 @18⅜	84 1/16	41½	5.75	6.02½	5 87½
21	18⅝ @18¾	18 5/16 @18⅜	84¾	41⅜	5.75	6.02½	5.87½
22	18⅝ @18¾	18 5/16 @18⅜	84¼	41¼	5.75	6.02½	5.87½

London quotations are per long ton (2,240 lb.) standard copper, which is now the equivalent of the former g. m. b's. The New York quotations for electrolytic copper are for cakes, ingots or wirebars. The price of cathodes is usually 0.125c. below that of electrolytic. The lead prices are those quoted by the American Smelting & Refining Co. for near-by shipments of desilverized lead in 50-ton lots, or larger orders. The quotations in spelter are for ordinary western brands; special brands command a premium.

Copper—Business is keeping up at a very satisfactory rate. Producers are generally well sold up for this and next month, while some large sales have been made several months ahead. Consumption continues exceedingly heavy, and sales have been made for export at a premium. The market closes firm at 18⅝ @18¾ for Lake; 18 5/16@18½ for electrolytic copper in ingots, cakes and wirebars; 18@18¼ for casting copper, ordinary brands.

Some apprehension is felt of a reduction in shipments from Chile owing to the earthquake, and this facilitated a drive against the bears in the London standard

market which upon receipt of the news advanced sharply, reaching £85 for spot. However, at the close there is a slight reaction, quotations being cabled as £84 7s. 6d. for spot, £84 5s. for three months.

Statistics for the first half of the current month show a decrease in the visible supplies of 300 tons.

Refined and manufactured sorts we quote: English tough, £86 10s.@£87; best selected, £89; strong sheets, £96.

Exports of copper from New York for the week were 2984 tons. Our special correspondent reports the exports for the week from Baltimore at 952 long tons of fine copper.

Imports and exports of copper in Great Britain for the seven months ending July 31 are reported as below; the totals giving the estimated contents of all material in fine copper. The figures are in long tons of 2240 lb.:

	1905.	1906.	Changes.
Copper ore	55,134	53,421	D. 1,713
Matte and precipitate	38,034	41,928	I. 3,894
Fine copper	41,526	43,003	I. 1,477
Total imp. fine copper	66,056	69,309	I. 3,253
Exports	25,354	23,441	D. 1,913
Balance	40,702	45,868	I. 5,166

Of the imports this year 3130 tons of matte and 14,590 tons of fine copper were from the United States; against 2780 and 18,149 tons, respectively, last year.

Tin—The London market fluctuated within narrow limits during the entire week, but at the close shows an advance to £183 for spot, £183 17s. 6d. for three months.

Premiums for spot tin are still paid in this market, but buyers are holding off on account of large arrivals which are expected the beginning of next week. Business has been done at 40½@41½, depending upon deliveries.

Imports and exports of tin in Great Britain for the seven months ending July 31, were as follows, in long tons:

	1905.	1906.	Changes.
Straits	17,487	21,882	I. 4,395
Australia	2,193	2,486	I. 293
Other Countries	1,425	732	D. 693
Total imports	21,105	25,100	I. 3,995
Exports	4,428	4,730	I. 302
Re-exports	16,201	18,987	I. 2,786
Total exports	20,629	23,717	I. 3,088
Net imports	476	1,383	I. 907

The re-exports are largely Straits tin to the United States.

Lead—The consumption is heavy, and whatever supplies come on the market are readily absorbed. There has been no change in the quotations, which continue 5.75c., New York.

The London market is firm and higher at the close, being cabled as £17 3s. 9d. for Spanish lead, £17 5s. for English lead.

St. Louis Lead Market—The John Wahl Commission Company telegraphs us on Aug. 22 as follows: Lead steady at 5.65@5.67½c. for Missouri brands.

Imports and exports of lead in Great Britain for the seven months ending July 31 were, in long tons:

	1905.	1906.	Changes.
United States	15,724	11,348	D. 4,376
Spain	60,221	66,968	I. 6,747
Australia	44,088	31,213	D. 12,875
Germany	9,553	10,787	I. 1,234
Other countries	1,448	1,863	I. 415
Total imports	131,034	122,179	D. 8,855
Exports	23,819	26,676	I. 2,857
Balance, imports	107,215	95,503	D. 11,712

The lead credited to the United States is chiefly Mexican lead, refined here in bond.

Spanish Lead Market—Messrs Barrington & Holt report from Cartagena, Spain, under date of Aug. 4, that pig lead is 77.50 reales per quintal, silver being paid for at 13.25 reales per ounce. The price of lead at current exchange—27.90 pesetas to £1—is equal to £15 11s. 2d. per long ton, f.o.b. Cartagena. Exports for the week were 151 tons argentiferous lead to Marseilles.

Spelter—The market is dull and entirely without feature. Prices are unchanged at 5.87½ St. Louis, 6.02½, New York.

From London, reports are more encouraging, and an advance is noted at the close, which is cabled as £27 for good ordinaries, £27 5s. for specials.

Imports and exports of spelter in Great Britain for the seven months ending July 31 were as follows, in long tons:

	1905.	1906.	Changes.
Spelter	47,787	52,065	I. 4,278
Zinc sheets, etc	11,596	11,020	D. 576
Total imports	59,383	63,085	I. 3,702
Exports	4,710	4,562	D. 148
Balance, exports	54,673	58,523	I. 3,850

Imports of zinc ores are not reported separately.

Spanish Zinc Ore Market—Messrs Barrington & Holt report from Cartagena, Spain, under date of Aug. 4, that the market is quiet. Sellers and buyers are still apart as to prices.

Zinc Sheets—The price of zinc sheets is $7.75 per 100 lb. (less discount of 8 per cent.) f.o.b. cars at Lasalle and Peru, in 600-lb. case for gages No. 9 to 22, both inclusive; widths from 32 to 60 in., both inclusive; the lengths from 84 to 96 in., both inclusive. The freight rate to New York is 27.5c. per 100 lb. The fluctuations in the base price for sheet zinc since Jan. 1, 1906, have been small, the highest price having been $8 on Jan. 6, the lowest $7.65 on May 18.

Antimony—There is no change. Quotations are nominal at 22½@23c. for ordinary brands; 24@25c. for special.

Nickel—Quotations for large lots, New York or other parallel delivery, as made by the chief producer, are 40@45c. per lb. for large orders, according to size of order and terms. For small lots, 50@65c. is charged.

Platinum—Demand is strong and steady. Prices are unchanged, $26 per ounce in New York. From $20 to $23 per ounce is paid for scrap platinum.

Quicksilver—The metal is firm and New York prices are still $41 per flask of 75 lb. for lots of 100 flasks or over, and $42 for small lots down to 10 flasks. For retail quantities, under 10 flasks, pound prices are charged, which work out to about $43 per flask. San Francisco prices are firm at $39.50 for domestic orders and $38 for export. The London price is lowest at £7 per flask, while jobbers are asking £16 18s. 9d.

Shipments of quicksilver by sea from San Francisco in July were 1260 flasks, valued at $47,267, which is an increase of 714 flasks, and of $28,800 in value over the corresponding month in 1905. The prices are very low, however, and much of the metal was exported, lower prices being received than for domestic consumption.

Imports of quicksilver into Great Britain for the seven months ending July 31, were 2,473,568 lb. in 1905, and 2,759,701 lb. in 1906; an increase of 286,133 lb. Re-exports were 994,525 lb. in 1905, and 1,103,102 lb. in 1906; an increase of 108,527 lb. this year.

Aluminum—The chief producers give list prices, for ton lots and over, as follows: No. 1, over 99 per cent. pure, 36c. per lb.; No. 2, over 90 per cent., 34c. Small lots are from 1 to 3c. higher. Granulated metal is 2c. per lb. over price of ingots; rods, 1c. per lb. over ingots. Rolled sheets are 45c. per lb. up, according to size.

Missouri Ore Market.

JOPLIN, Aug. 18.

The highest price paid for zinc was $48.50 per ton, on an assay basis of $42 @45.50 per ton of 60 per cent. zinc. The average price was $44.30. The highest price a year ago was $57.

The highest price for lead was $78.50 per ton, the average $76. The highest price a year ago was $61.50.

Zinc prices were advanced 50c. per ton on several bins of the choicest ore, on an advance of that amount in the assay valuation, competition being stronger on all grades, with but minor changes elsewhere. The shipment was an increase of 10 per cent. over the previous week and 25 per cent. over the corresponding week of last year. Threatened damage by last week's heavy rains did not prove as serious as feared, and the output of the week was unusually large by the starting of mills over new mines. Aurora was damaged most by the rains, but operations will be resumed there next week at all the heaviest producing mines.

While the highest price paid for lead was no advance over the previous week, yet a stronger competition for this min-

eral advanced the average price. The Picher Lead Company, a light buyer for several weeks, was in the market, paying as high as the other companies.

Following are the shipments of zinc and lead from the various camps of the district for the week ending today:

	Zinc, lb.	Lead, lb.	Value.
Webb City-Carterville	3,708,520	868,710	$116,451
Joplin	2,622,000	331,940	71,610
Galena-Empire	1,102,580	116,000	28,113
Duenweg	920,580	130,630	25,676
Badger	970,800	2,350	22,902
Alba	764,790	.....	17,972
Neck City	587,210	.....	13,799
Prosperity	267,170	118,450	10,510
Aurora	585,960	.....	8,920
Spurgeon	238,500	32,050	7,988
Granby	394,000	35,000	7,265
Carthage	253,850	2,310	6,052
Oronogo	257,760	5,250	5,660
Sherwood	37,310	22,090	1,697
Zincite	60,630	.....	1,425
Stott City	51,220	.....	1,100
Sarcoxie	45,230	.....	949
Totals	12,858,110	1,664,780	$348,189
33 weeks	347,941,060	48,539,090	$9,389,973

Zinc value, the week, $284,901; 33 weeks, $7,543,818.
Lead value, the week, 63,288; 33 weeks, 1,846,155.

The following table shows the average monthly prices of zinc and lead ores in Joplin, by months; the average for zinc being based on the prices of assay basis ores carrying 60 per cent. zinc.

ZINC ORE AT JOPLIN.			LEAD ORE AT JOPLIN.		
Month.	1905.	1906.	Month.	1905.	1906.
January	52.00	47.38	January	61.50	75.20
February	52.77	47.37	February	57.62	72.83
March	47.40	42.68	March	57.20	73.73
April	42.88	44 63	April	58.00	75.13
May	43.31	40.51	May	58 27	78.40
June	40.75	43.83	June	57.80	80.96
July	43.00	43.25	July	58.00	74.31
August	48.83	....	August	58.00	....
September	46.75	....	September	63.50	....
October	47.60	....	October	63.86	....
November	49.55	....	November	68.67	....
December	49.00	....	December	76.25	....

Wisconsin Ore Market.

PLATTEVILLE, Aug. 18.

A careful study of the conditions governing the production of zinc ore shows a continued strong market for all grades of zinc ore. Prices of 60 per cent. ore ranged from $43 to $44. One or two lots of fancy ore brought as high as $46.50. The principal feature of the week has been the renewed interest in actual mining developments.

The demand exceeds the supply in the Wisconsin zinc district, with the bins all, or nearly all, empty. The outlook is good.

Drybone and sulphur and lead prices remain about the same as last week.

The camps of the Platteville district loaded ore as follows for the week ending Aug. 18:

Camps.	Zinc, Lb.	Lead, Lb.	Sulphur, Lb.
Platteville	198,000	44,100	....
Mineral Point	782,800	.....	.....
Linden	274.270	55,000	.....
Harker	29,340	.....	.....
Dodgeville	400,280	52,360	.....
Total for week	1,684,690	151,460	.....
Year to Aug. 18	42,523,681	2,297,550	3,573,470

The tonnage above reported from Dodgeville has been shipped out during the last six months and not previously reported.

Extremely good weather stimulated loading during the early part of the week. Labor conditions promise to be a little better as soon as harvesting is over, when it is expected that the farm hands will be attracted to the mines by the high wages that are offered. Unusual preparations are being made on all sides for the coming winter. Work is being pushed so as to get all buildings up and enclosed, so that development work will not be hampered by cold weather.

Mining Stocks.

NEW YORK, Aug. 22.

The declaration of the Union Pacific and Southern Pacific dividends last week started the stock markets on a period of excitement, and a real boom has been the result. How much of this is manufactured, and how much is due to actual buying by the general public, is hard to say. It is probable, however, that the excitement has really drawn in many of the class which always wants to buy on a rising market. Sales on the exchange have been larger during the week than for many months past.

Amalgamated Copper was on top of the boom, and sold up to $111½, closing at $109½. American Smelting common closed at $163½; Tennessee Coal, Iron and Railroad at $161; United States Steel at $45½ for the common and $108 for the preferred.

The curb market felt the boom, and trading was active. Guggenheim Exploration was a feature, closing at $285. Green Copper sold largely around $25. Montgomery-Shoshone, of Nevada, brought $12, while $5½ was paid for Tonopah Extension.

On the Consolidated Exchange Ophir was quoted at $3.70@3.75; Consolidated California & Virginia, 97@98c.; while $1.75 was paid for Standard Consolidated, of California, and $1.20 for Portland, of Cripple Creek.

The Standard Oil dividend for the September quarter is $6 per share, against $9 three months ago, and $6 a year ago. This dividend will make $30 paid this year, for three quarters. Standard Oil dividends are always a problem, and never what the exchange expects.

There were sales of Homestake, of South Dakota, during the week, 200 shares changing hands at $83½@84 per share.

Boston. Aug. 21.

Our market has been active and excited all the week, and still continues in that condition, notwithstanding the hardening of money and the prospect that speculators will have to pay well for the accommodation they are likely to need. Today there has been some recession of prices on profit taking, and an irregular market all round.

Amalgamated Copper has been especially active; today there were over 10,000 shares sold, and the closing price was $108.50, some $3 below highest point reached. The copper specialties have been generally firm, but quieted down on today's sales. Calumet & Hecla touched $720. Osceola sold at $112; Tamarack, $99.50; Quincy, $93.50. Wolverine sold some shares at $153, and Copper Range at $78.50 per share.

Utah Copper rose to $61, and North Butte to $92.50, while Boston Consolidated lost $1 to $29. Trinity was traded in at $9.50. The market today was generally quieter than it has been for a week, with some easing of prices toward the close.

Last week's advance is considerable, but has hardly made up for the losses of the dull weeks preceding.

Colorado Springs. Aug. 17.

The market has been fairly active during the past seven days, but with a tendency to weaker prices. Portland was the feature of the week, dropping from $1.40 to $1.25 on the driving of the Burns faction. At last the Cripple Creek drainage tunnel has taken definite shape, the Drainage Tunnel Company having been incorporated. It will drive a tunnel 740 ft. below the present tunnel. The incorporators are the officers of the larger mines of the district.

San Francisco. Aug. 16.

The San Francisco Stock and Exchange Board, whose fine buildings in Pine street were destroyed by the great fire, celebrated the opening of its new building on Bush street, near Montgomery, on Saturday. The new structure is of wood and is temporary only, but the accommodations for doing business are excellent. The institution has been for many years identified with the stocks of Nevada mines. Little is being done at present as compared with the volume of daily sales before the fire, but the brokers are hopeful that the old times will come back in due course when mining becomes more plentiful. Trading during the week has been chiefly in the Tonopah stocks, which have been active, with prices strong. The Comstocks have been quiet, with comparatively little trading. It follows that prices have been weak.

Mexico. Aug. 12.

Mining stocks for the past week were most unusually quiet, and there was a consequent downward tendency in all. The few sales reported were in the State of San Luis Potosi: Santa Maria de La Paz, at $261, and Barreño, at $204. State of Guanajuato: Providencia San Juan de La Luz, $175. State of Nuevo Leon: Norias de Bajan, at $1065. State of Hidalgo: Blanca y Anexas, $665; Santa Gertrudis y Guadalupe, at $87; San Rafael at $985, and Amistad y Concordia, at $68 per share.

STOCK QUOTATIONS.

NEW YORK. Week Aug. 21

Name of Company.	High	Low	Clg.	Sales
Amalgamated*	111⅛	104½	107⅜	895,830
Anaconda*	274	257½	269	265,150
British Col. Copper	9⅛	8⅛	9⅛	14,850
Butte Coalition*	32¾	30⅜	31⅜	5,100
Cum. Ely Mining	8	7⅛	8	6,700
Greene Gold	2½	2⅛	2⅜	1,855
Greene Gold & Silver	2⅛	2	2⅛	1,505
Guanajuato	5⅜	5¼	5⅜	5,500
Micmac	5½	5	5⅛	4,050
Mines Co. of Am	1.25	1.25	1.25	2,730
Mitchell Mining	6⅜	4¼	6	6,180
Mont. Sho. Con. (New)	12¾	11⅞	11⅞	7,497
Nev. Utah M. & S.	4	3½	4	3,350
Nipissing Mines	6⅜	5⅞	6⅜	13,650
Tennessee Copper	46⅛	43⅞	45¾	1,560
Union Copper	1⅜	1½	1⅜	7,200
Utah Apex	6¼	5⅞	6¼	900

NEW YORK INDUSTRIALS.

Am. Smelting & Ref.	164⅛	153¾	160¾	288,150
Am. Smelt. & Ref., Pf.	119	117	118¼	2,500
Bethlehem Steel	24	21⅞	24	900
Colo. Fuel & Iron	61⅛	54	58¾	191,670
Federal M. & S., Pf *	97½	96	97⅜	1,270
Inter. Salt*	35⅞	35	35½	1,000
National Lead	82⅛	79	80	45,700
National Lead, Pf	104	102¼	104	300
Pittsburg Coal	15⅜	15¼	15⅛	400
Republic I. & S.	31¼	29	29½	35,200
Republic I. & S., Pf.	101¾	99¼	101	10,500
Sloss-Sheffield	81	76	79⅛	15,400
Tenn. C. & I.	162½	155	162½	2,850
U. S. Red. & Ref	37¾	36	36⅛	1,400
U. S. Red. & Ref., Pf.	76	74½	74¾	1,800
U. S. Steel	46	41⅛	44⅛	861,750
U. S. Steel, Pf.	109¼	106	107¼	142,987
Va. Car. Chem	41	37	40	11,050

* Ex. div.

BOSTON.

Adventure	6¾	6	6⅛	1,610
Allouez	39	36½	37	4,445
Atlantic	15	12	14⅛	1,660
Bingham	34	33	33⅛	4,810
Boston Consolidated	30	26	29	8,215
Calumet & Arizona	112	109	112	1,029
Calumet & Hecla*	742½	700	717	149
Centennial	27	24	26	3,117
Copper Range	79	75¼	77⅛	11,289
Daly-West	17	16⅞	17	350
Franklin	18¾	17⅛	18¾	1,846
Granby	12⅛	12	12⅜	800
Greene Consolidated	25⅞	24½	25	8,454
Isle Royal	21	19½	20¾	3,235
Mass	9	8⅛	8¾	875
Michigan	14	13	13¾	890
Mohawk	63	61½	62½	749
Mont. Coal & Coke rcts.	2¾	2⅜	2⅜	65
Nevada	18⅝	18	18½	961
North Butte	93	90	92	9,088
Old Dominion	43¼	41¾	42⅛	4,660
Osceola	112	106½	111¾	4,794
Parrot	28½	26½	27	1,235
Quincy*	93½	84	93⅛	346
Rhode Island	5¼	4½	5	2,505
Shannon	9⅞	9⅛	9⅝	3,035
Tamarack	100	99⅛	99⅞	230
Tecumseh	13	10¾	12¼	3,322
Trinity	9⅛	8½	9⅜	2,604
United Copper, com.	64¾	63⅞	64⅜	5,015
U. S. Oil	10⅛	10	10	520
U. S. Smg. & Ref.	58	55	56⅞	3,792
U. S. Smg. & Ref., pfd.	46¼	45⅝	46	2,155
Utah Copper	61	57⅛	60	9,159
Victoria	7⅛	6½	7⅛	525
Winona	9	8	8⅛	1,145
Wolverine	154¼	151	154	433
Wyandotte	1.00	1.00	1.00	

These stocks, not elsewhere quoted, had the following range of prices during the week: (New York) Am. Agri. Chem., 26—23⅝; Gold Hill, 2½—2½; Comstock, .14; Gugg. Exp., 291—275; Prec. Metals Co., 5½; Standard Oil, 613—608. (Boston) Ahmeek, 80—78; Am. Zinc, 12—9½; Arcadian, 2⅞—2½; Ariz. Com'l, 40⅛—37; Black Mt., 8½—8½; East Butte, 11½—10; Keweenaw, 13½—10½; Majestic, 1⅛—1½; Raven, .87—.86; Shawmut, 1.00—.95; Superior & Pitts., 17—16½; Troy, 1⅞—1⅛.

PHILADELPHIA. Aug. 21.

Name of Company.	High	Low	Clg.	Sales.
American Cement	7⅝	7⅛	7⅜	50
Cambria Steel	36½	34½	35¾	7,541
General Asphalt	8⅜	8	8⅛	103
Penn. Steel, pd	108½	108½	108½	20
Philadelphia Co.	50½	50¼	50¼	461
Tonopah Mining	19	18	18⅛	2,180

PITTSBURG. Aug. 21.

Crucible Steel	13½	12¾	13¼	1,775
Crucible Steel, Pf.	80¾	78¼	80½	1,877
Harbison-Walker Ref.	11	11	11	
Ohio Tonopah	.31	.30	.30	1,900
Tonopah Ext	6¾	5½	6¼	4,135

COLORADO SPRINGS. Aug. 18.

Name of Company.	High	Low	Clg	Sales
Acacia	13⅛	12⅛	12⅛	15,000
C. C. Con	5⅝	5⅝	5⅝	
Doctor Jack Pot	8⅞	8¾	8¾	4,500
Elkton	46½	46	46	3,000
El Paso	49⅜	46½	46½	5,500
Findley	72	70	71	9,700
Gold Dollar	8¼	8	8	
Gold Sovereign	7¼	7	7¼	
Isabella	23¼	22¼	22¾	8 250
Jennie Sample	10	9¾	9¾	
Mary McKinney	53⅛	49	53⅛	9,300
Portland	1.40	1.25	1.25	5,800
United Gold Mines	9½	7⅜	9⅜	
Vindicator	95	92	95	
Work	16¾	15¾	15½	33,500

SAN FRANCISCO. Aug. 15.

Name of Company.	High	Low	Clg	Sales
Best & Belcher	.72	.68	.71	500
Caledonia	.25	.23	.24	1,900
Challar	.14	.11	.14	2,600
Con. Cal. & Va	.90	.84	.90	3,850
Crown Point	.09	.09	.09	500
Gould & Curry	.08	.07	.08	6,250
Hale & Norcross	1.00	.99	1.00	1,200
Mexican	.77	.66	.77	6,600
Ophir	3.60	3.40	3.60	3,000
Overman	.10	.09	.09	300
Potosi	.13	.12	.13	1,800
Savage	.99	.80	.99	2,000
Sierra Nevada	.20	.18	.20	1,500
Bullfrog Mining	.58	.48	.58	30,000
Diamondfield	.40	.36	.39	32 300
Goldfield of Nevada	.51	.44	.49	39,400
Jim Butler	1.45	1.40	1.45	13,400
Jumping Jack	.37	.32	.35	143,200
Kendall	.70	.62	.70	4,500
MacNamara	.76	.73	.75	18,200
Manhattan Dexter	.68	.61	.67	19,050
North Star	50	.47	.49	23,700
Original Bullfrog	.18	.14	.15	24,900
Tonopah Belmont	5.25	5.25	5.25	500

Tonopah Stocks. Aug. 22.

(Revised by Weir Bros. & Co., New York.)

	High.	Low.	Last.
Tonopah Mine of Nevada	19 00	18.75	18.75
Tonopah Montana	3.00	2.97	2.98
Tonopah Extension	6 25	6.12½	6.12½
Tonopah Midway	2.25	2.20	2.20
Tonopah West End	3 00	3.00	3.00
Goldfield Mining Co.	.70	.69	.70
Jumbo Mining	1.60	1.58	1.59
Red Top	1.75	1.70	1.70
Sandstorm	.97	.95	.95
Montgomery Shoshone Cons	12.50	12.50	12.50

St. Louis. Aug. 18.

Adams, $0.40—$0.25; American Nettie, $0.10—$0.08; Center Creek, $3.25—$2.50; Central Coal and Coke, $64.50—$63.50; Central Coal and Coke, pfd., $80.00—$79.00; Central Oil, $60.00—$55.00; Columbia, $5.00—$3.50; Con. Coal, $21.50—$18.50; Doe Run (old stock), $350.00—$300.00; Granite Bimetalic, $0.25—$0.20; St. Joe (old stock), $32.50—$30.00.

LONDON. (*By Cable.**) Aug. 22.

Dolores, £1 17s. 6d.; Stratton's Independence, £0 4s. 3d.; Camp Bird, £1 4s. 6d.; Esperanza, £3 11s. 3d.; Tomboy, £1 5s. 0d.; El Oro, £1 10s. 7½d.; Oroville, £0 18s. 9d.; Somera, £0 6s. 3d.; Utah Apex, £1 7s. 6d.; Ariz. Copper, Pref., £3 12s. 9d.; Ariz. Copper, Def., £3 10s. 6d.

*Furnished by Hayden, Stone & Co., New York.

New Dividends.

Company.	Payable.	Rate.	Amt.
American Coal Co	Sept. 1	$1.25	$62,500
Am. Smelters' Sec. pf. A	Sept. 1	1.50	155,000
Butte Coalition	Sept. 14	0.40	400,000
Calumet & Hecla	Sept. 20	20.00	2,000,000
Granby Con	Sept. 1	3.00	405,000
Greene Con. Copper	Sept. 15	0.40	345,500
Mines Co., of America	Aug. 20	0.01½	30,000
National Lead	Oct. 1	1.00	149,054
National Lead, Pfd	Sept. 15	1.75	260 820
N. Y. & Hon. Rosario	Aug. 25	0.20	30 000
Parrot	Sept. 12	0.25	57,463
Quincy Copper	Sept. 5	2.50	250,000
Standard Oil	Sept. 15	6.00	5,820,000

Assessments.

Company.	Delinq.	Sale.	Amt.
Cal. Grass Valley	Aug. 30	Sept. 15	$0.02
Con. St. Gothard, Cal.	Aug. 23	Sept. 15	0.10
Copper Ranch, Utah	Sept. 4	Sept. 24	0.00½
East Valco, Utah	Sept. 1	Sept. 19	0.01
Lucky Dutchman, Nev.	Sept. 4	Sept. 26	0.01
Patterson Creek, Cal.	Aug. 23	Sept. 15	0.10
Silver Bell, Utah	Sept. 4	Sept. 20	0 00½
Silver Shield, Utah	Sept. 5.		0.03
Wabash, Utah	Sept. 6	Sept. 29	0.10
West Quincy, Utah	Sept. 7	Sept. 27	0.10

Monthly Average Prices of Metals.

SILVER.

Month.	New York.		London.	
	1905.	1906.	1905.	1906.
January	60.690	65.288	27.930	30.113
February	61.023	66.108	28.047	30.464
March	58.046	64.597	26.794	29.854
April	56.600	64.765	26.108	29.984
May	57.832	66.976	26.664	30.968
June	58.428	65.394	26.910	30.185
July	58.915	65.105	27.163	30.113
August	60.259	.. ..	27.822	
September	61.695		28.528	
October	62.034		28.637	
November	63.849		29.493	
December	64.850		29.977	
Year	60.352		27.839	

The New York prices are in cents per fine ounces; the London quotation is in pence per standard ounce, .925 fine.

COPPER.

	NEW YORK.				LONDON.	
	Electrolytic.		Lake.			
	1905.	1906.	1905.	1906.	1905.	1906.
Jan	15.008	18.310	15.128	18.419	68.262	78.896
Feb	15.011	17.869	15.136	18.116	67.963	78.147
March	15.125	18.361	15.250	18.641	68.174	81.111
April	14.920	18.375	15.045	18 688	67.017	84.793
May	14.627	18.457	14.820	18.724	64.875	84.867
June	14.673	18.442	14.813	18.719	65.881	83.994
July	14.888	18.190	15.005	18.585	66.887	81.167
Aug	15.664		15.725		69.830	
Sept	15.965		16.978		69.667	
Oct	16.279		16.332		71.406	
Nov	16.599		16.758		74.727	
Dec	18.328		18.398		78.993	
Year	15.590		15.699		69.465	

New York prices are in cents per pound. Electrolytic quotations are for cakes, ingots or wire bars. The London prices are in pounds sterling, per long ton of 2,240 lb., standard copper.

TIN IN NEW YORK.

Month.	1905.	1906.	Month.	1905.	1906.
Jan	29.325	36.390	July	31.760	37.275
Feb	29.262	36.403	August	32.866	
March	29.523	36.662	Sept	32.095	
April	30.525	38.900	Oct	32.481	
May	30.049	43.313	Nov	33.443	
June	30.329	39.260	Dec	35.835	
			Av. year.	31.358	

Prices are in cents per pound.

LEAD IN NEW YORK.

Month.	1905.	1906.	Month.	1905.	1906.
Jan	4.552	5.600	July	4 524	5.750
Feb	4.450	5.464	Aug	4.665	
March	4.470	5.350	Sept	4.850	
April	4.500	5.404	Oct	4.850	
May	4.500	5.685	Nov	5.200	
June	4.500	5.750	Dec	5.422	
			Av., year	4.707	

Prices are in cents per pound. The London average for January, 1906, was £ 16.850 per long ton; February, £ 16.031; March, £ 15.922; April, £15.959; May, £16.725; June, £16.813; July, £16.525.

SPELTER.

Month.	New York.		St. Louis.		London.	
	1905.	1906.	1905.	1906.	1905.	1906.
Jan	6.190	6.487	6.032	6.337	25.062	28.225
Feb	6.139	6.075	5.989	5 924	24.594	25.844
Mar	6.067	6.209	5.917	6.056	23.825	24.563
April	5.817	6.078	5.667	5.931	23.813	25.781
May	5.434	5.997	5.284	5.846	23.594	27.000
June	5.190	6.096	5.040	5.948	23.875	27.728
July	5.396	6.006	5.247	5.856	23.938	26.800
Aug	5.706		5.556		24.675	
Sept	5.887		5.737		26.375	
Oct	6.087		5.934		28.225	
Nov	6.145		5.984		28.500	
Dec	6.522		6.374		28.719	
Year	5.822		5.730		25.433	

New York and St. Louis prices are in cents per pound. The London prices are in pounds sterling per long ton (2,240 lb.) good ordinary brands.